AN. 1935

MODERN MECHANIX and INVENTIO

January

MODERN MECHANIX
AND INVENTIONS

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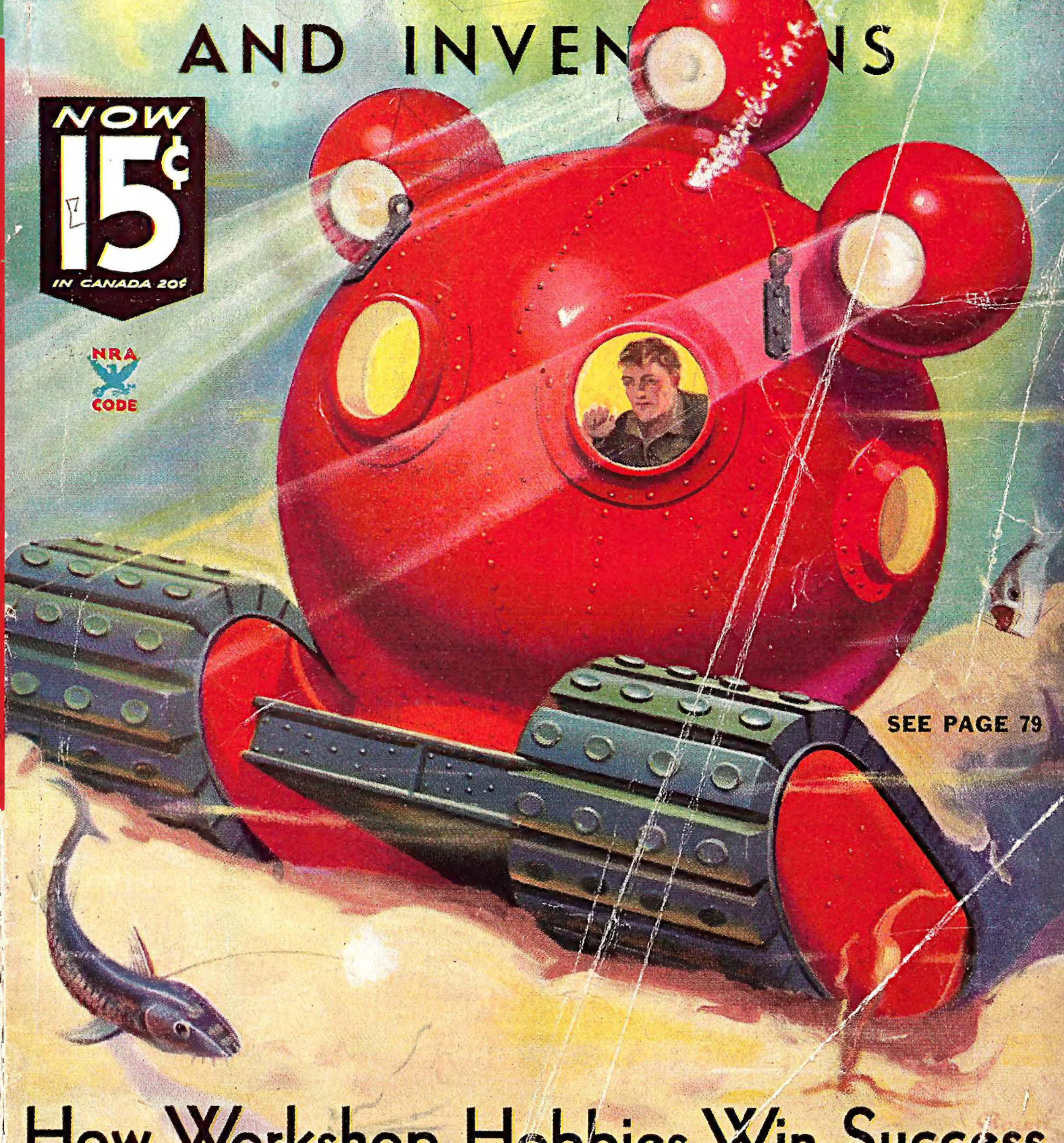

SEE PAGE 79

How Workshop Hobbies Win Success

By the President of Packard Motors

SAVE UP TO 50% by BUYING YOUR RADIO *Direct from* MIDWEST LABORATORIES

Thrill to Guaranteed World-Wide HIGH FIDELITY *Performance with This Amazing New* 1935 MIDWEST SUPER *Deluxe* 16-TUBE ALL-WAVE Radio!

(ALL FIVE WAVE BANDS)

ONLY RADIO COVERING
9 TO 2,400 METERS.
12,000 MILE TUNING RANGE

WORLD'S GREATEST
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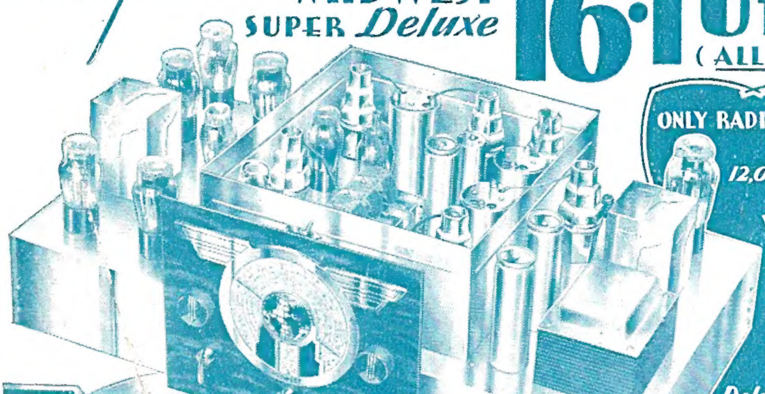
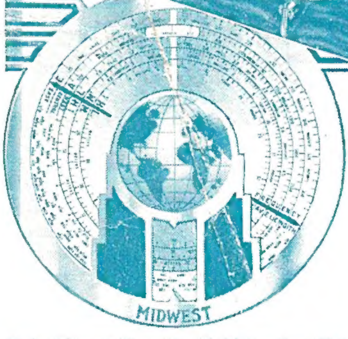
$57 50
with New Deluxe Auditorium-Type
SPEAKER
(LESS TUBES)





30 Days FREE Trial!

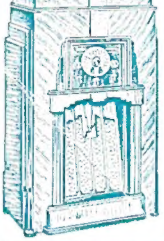
TERMS
as low as
$5 00
DOWN

BEFORE you buy any radio write for the new FREE 1935 Midwest "Fifteenth Anniversary" catalog and see for yourself the many reasons why 110,000 satisfied customers bought their radios direct from the Midwest Laboratories and saved from ⅓ to ½. Why pay more than the direct-to-you laboratory price? You, too, can make a positive saving of from 30% to 50% by buying this more economical way. Learn why Midwest outperforms sets costing up to $200.00 and more. Never before so much radio for so little money! Midwest gives you triple protection with: **One-Year Guarantee, Foreign Reception Guarantee, Money-Back Guarantee.**

Only Midwest Gives You Multi-Function Dial

This dial was designed in keeping with the trend of the times, yet is not an airplane dial! It is a many-purpose dial that performs many functions. Now, Midwest guarantees that inexperienced persons can secure good foreign reception. Send for FREE miniature of actual rotating dial which clearly shows these outstanding advantages:

1. **Dial calibrated in Kilocycles, Megacycles and Meters;**
2. **Call letters of American Broadcast Stations printed on dial and illuminated;**
3. **Slow-Fast, Smooth-Acting Tuning;**
4. **Station Group Locator;**
5. **Simplified Tuning Guide Lights;**
6. **Automatic Select-O-Band Indicator;**
7. **Illuminated Pointer Indicator;**
8. **Silent Shadow Tuning—Improvement on Meter Tuning;**
9. **Centralized Tuning.**



New Style Consoles

The Midwest 36-page catalog pictures a complete line of beautiful, artistic de luxe console and chassis in four colors. Write for new FREE catalog today! **Midwest long-range radios are priced as low as . .** $27 50

50 ADVANCED 1935 FEATURES

Many exclusive features include: Micro-Tenuator...Fidel-A-Stat...Separate Audio Generator...Ceramic Coil Forms, etc. Only Midwest covers a tuning range of 9 to 2400 meters (33 Megacycles to 125 KC)—enabling you to easily and successfully tune in even low-powered foreign stations up to 12,000 miles away with crystal-clear, loud-speaker reception.

All 5 Wave Bands enable you to enjoy today's finest High Fidelity American programs. In addition, you get Canadian, police, amateur, commercial, airplane and ship broadcasts and derive new delight and new excitement from unequalled world-wide broadcasts... England, France, Germany, Spain, Italy, Russia, Australia, etc. Send today for money-saving facts!

SENSATIONAL HIGH FIDELITY RECEPTION

This bigger, better, more powerful, clearer-toned, super selective, 16-tube radio gives you absolute realism—assures you of life-like, crystal-clear tone—unlike anything you have ever experienced before. You will hear one more octave—overtones—that cannot be brought in with ordinary radios. Now, hear every instrument, every voice, every shade and inflection of speech.

THRILL
MIDWEST

• •

Take advantage of the amazing 30-day FREE trial offer. Send for FREE catalog.

• •

Listens to World-Wide Reception

Middletown, O.—Here are some of the stations I have heard: EAQ, Madrid, Spain—DJB, Zeesen, Germany—GSB, GSF, Daventry, England—VK3ME, Melbourne, Australia—VK2ME, Sydney, Australia—HJ2ABA, HJ4ABE, HJ3ABF, Colombia, S. A., and many more. Golden Hatfield, 2202 Grand Avenue.

Peruvian Praises Foreign Reception

Lima, Peru—We have heard the five continents with your Midwest. Have received Madagascar, Sydney, London, Paris, Vienna, Moscow, Madrid, New York, Shanghai, Tokio and also South American transmitters. Marquis H. Buchanan, Apartado 96, Plaza San Martin, 171.

DEAL DIRECT WITH LABORATORIES

SAVE UP TO 50%

Increasing costs are sure to result in higher radio prices soon. Buy before the big advance...NOW...while you can take advantage of Midwest's sensational values...no middlemen's profits to pay. You can order your 1935 High Fidelity radio from the new Midwest catalog with as much certainty of satisfaction as if you were to select it in our great radio laboratories. You save 30% to 50% when you buy this popular way...you get 30 days FREE trial.. **as little as $5.00 down** puts a Midwest radio in your home. Satisfaction guaranteed or money back. Write for new FREE catalog today.

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MIDWEST RADIO CORP.,
Dept. 811
Cincinnati, Ohio.

Without obligation on my part send me your new FREE 1935 catalog, FREE Miniature Dial, and complete details of your liberal 30-day FREE trial offer. This is NOT an order.

User-Agents Make Easy Extra Money
Check Here for Details ☐

Name ....

Address ....

Town .... **State** ....

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DEPT. 811 — CINCINNATI, OHIO, U. S. A.
Established 1920 Cable Address Miraco. . . . All Codes

LEARN RADIO FROM REAL RADIO ENGINEERS

HERE THEY ARE:

Dr. C. M. Blackburn, Chief Radio Engineer, Grigsby-Grunow Company (Majestic).

Kendall Clough, Chief Engineer, Clough-Brengle Co. (Radio Engineers and Manufacturers)

Karl Hassel, Chief Engineer, Zenith Radio Corporation.

Homer Hogan, Gen. Manager, Radio Station KYW, Chicago.

R. MacGregor, Service Manager and Sales Engineer, Transformer Corporation of America (Clarion).

H. C. Tittle, Chief Radio Engr., Stewart-Warner Corporation.

F. D. Whitten, Service Manager, Chicago Plant, Philco Radio and Television Corporation.

LET THESE ENGINEERS RIGHT FROM THE HEART OF THE BIG RADIO INDUSTRY *Train You at Home for*

GOOD PAY RADIO WORK

MANY R-T-I TRAINED MEN MAKE $35 TO $75 A WEEK

If you're dissatisfied with small pay—work that's getting you nowhere—lay-offs and uncertain income—here's an opportunity that's too good to miss. At the cost of only the time it takes you to mail the coupon, you can get my big FREE book, "RADIO'S FUTURE AND YOURS." This book tells how you can learn at home to make more money almost at once in Radio—whether you want to make Radio your life's work, or use it to pick up an extra $5 to $20 a week in your spare time.

"RADIO IS GROWING BY LEAPS AND BOUNDS"

says *Radio Craft Magazine.* It has forged ahead even in depression years. Where only a few hundred men were employed a short time ago, thousands are employed today. Where a few years ago a hundred jobs paid $35 to $75 a week—there are thousands of such jobs today. And more new jobs being created all the time—*full time jobs and spare time jobs.* Get my book and see how easy it is to learn at home for this good-pay work.

R-T-I TRAINING IS "SHOP TRAINING" FOR THE HOME

It comes to you right from the Radio Industry—right out of the factories where Radio sets and other vacuum-tube devices are made. It was planned and prepared for you by big radio engineers IN these factories, most of whom are the Chief Engineers of these great Radio plants. And NOW these same engineers are actually supervising R-T-I Training. Which means that trained the R-T-I way, you'll be trained as the Radio Industry wants you trained—just as the Radio Industry, itself, would train you if it was doing the job.

4 BIG WORKING OUTFITS INCLUDED

These are probably the biggest and most expensive Working Outfits ever included with a home-training Course. You use them to build up testing equipment—to experiment with—to do actual Radio work. It's Shop Training for the home.

SOUND PICTURES, P. A. SYSTEMS, PHOTO CELLS, TELEVISION, ETC. ALL INCLUDED

Radio service work is just the starting point in R-T-I Training. From there we take you up through the very latest developments in Radio, and then on into the new and larger field of Electronics—Sound Pictures, Public Address Systems, Photo Cells, and Television. This feature alone makes R-T-I the outstanding home training in Radio.

YOU GET "QUICK RESULTS"

C. E. Head, 431 Third St., Alexandria, La., says: "Made my first money 11 days after starting your training—cleared $14.25."

Frank E. Klemann, Lisle, Ill., writes: "Doubled my pay in less than six months."

Harry L. Stark, Ft. Wayne, Ind., writes: "Now making three times as much money as I was when I started your training."

AGE OR LACK OF EDUCATION NO HANDICAP

You don't have to be a high school graduate. It isn't necessary that you should have finished the grades. My Training in Radio is so simple, so easy, and so practical, that it offers every man, regardless of age, education, or previous experience, the chance to get out of a small-pay, no-future job, into good pay, big future work in Radio.

YOUR MONEY BACK IF YOU ARE NOT SATISFIED

That's my way of doing business. And I'll give you that agreement in writing—an agreement to refund every penny of your tuition if, on completion of my Training, you are not entirely satisfied.

INVESTIGATE! Learn why R-T-I Training is different. Find out why R-T-I Trained men get "Quick Results" and "Big Results." Send today for my big book "Radio's Future and Yours." The book is free. **RAY D. SMITH,** *President*
Radio & Television Institute, Chicago

"We OK Radio and Television Institute home training"

say these 30 LEADING RADIO MANUFACTURERS

and they are talking to YOU

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Get your copy of "Radio's Future and Yours" today. It tells you about Radio's amazing opportunities. It describes my Course. It tells what R-T-I students are doing and making. It's FREE. Clip, sign and mail coupon RIGHT NOW!

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2130 Lawrence Ave., Dept. 31
Chicago, Ill.

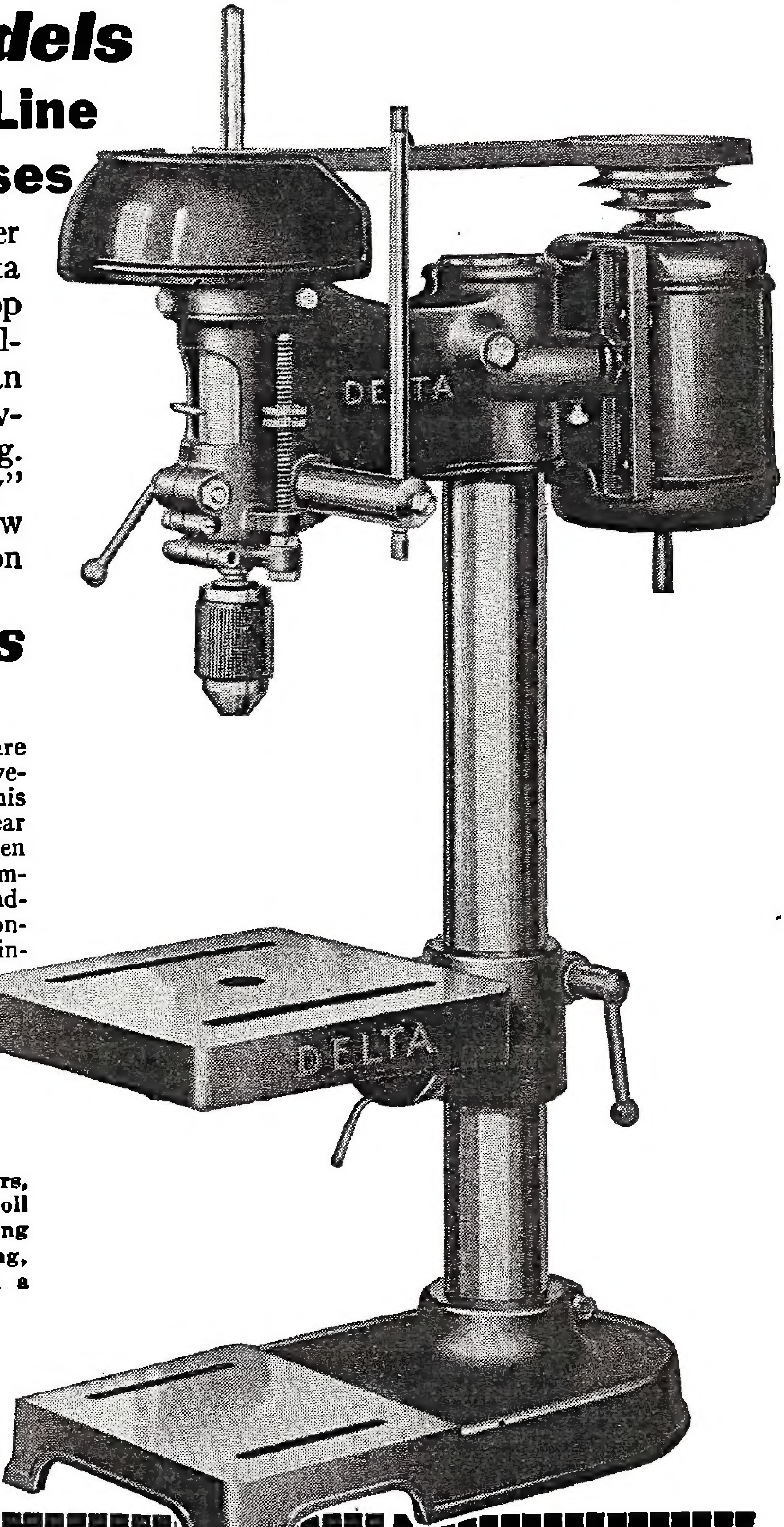
Without obligation of any kind please send me a copy of "Radio's Future and Yours." I am interested in your home training and the opportunities you say exist in the great field of Radio for the R-T-I Trained man.

Name...
Address...
City................................*State*............

New Drill Press

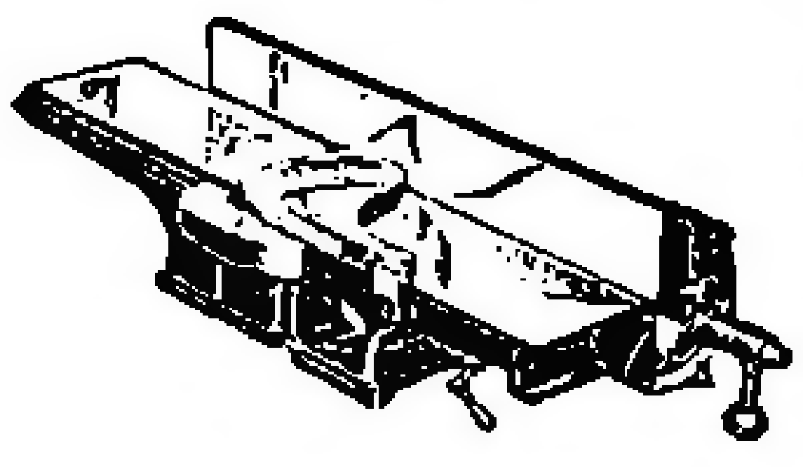
New "DELTA" Models

Now Complete Full Line of Modern Drill Presses



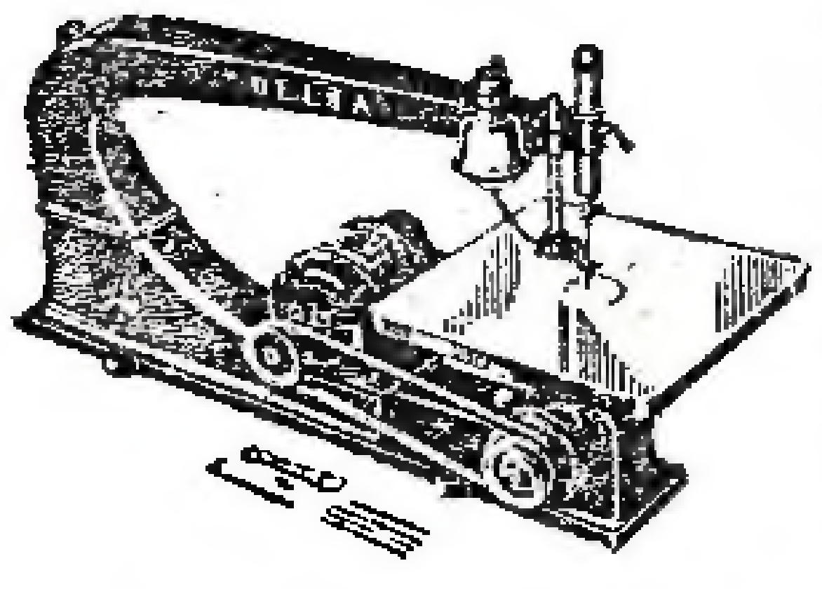
Two new "Slo-Speed" Drill Presses together with other models now makes available Delta Drills for every purpose—in home workshop and factory alike. A Delta Drill Press is almost a complete workshop in one tool. It can be used for mortising, routing, drilling, carving, sanding, shaping and surface grinding. Delta Drill Presses embody Delta "quality" throughout—and yet are priced at unusual low price levels. Send for catalog. See coupon below.

NEW TOOLS—NEW FEAUTRES IN 1935 "DELTA" LINE!



NEW 6-INCH JOINTER

Has new Patented Fence and many unusual improvements.



NEW SCROLL SAW

Cuts with finest jeweler's blades at full motor speed. Many other features

The new "Delta" Drill Presses are but two of the many new improvements and tools announced this year by Delta engineers. This year the Delta line of motor-driven woodworking tools is more complete than ever before. Delta standards of efficiency, quality and convenience have been strictly maintained—and Delta prices still kept at their low levels. Good compact motor-driven tools are within the reach of all. Every woodworker will find the new 1935 Delta line of unusual interest.

The "Delta" line includes: Jointers, Circular Saws, Band Saws, Scroll Saws, Drill Presses, Woodturning Lathes, Boring, Routing, Sanding, and Mortising Attachments—and a complete line of accessories.

WRITE FOR CATALOG

The 1935 catalog of Delta quality motor-driven tools is now off the press. It is crowded with photographs and information about the new line of 1935 Delta tools. It shows how Delta tools are built to stand the grind of production work, and yet are so low priced as to be within the reach of all.

Send coupon so your name will be placed on the mailing list to receive the 1935 Delta catalog without delay. Enclose only 10c at same time for Book of Practical Delta Projects. 32 pages of new and novel things to make, with many blue prints, working drawings, photographs and illustrations—and complete directions.

DELTA MANUFACTURING COMPANY. Dept. M 135
3775 N. Holton Street Milwaukee, Wisconsin

DELTA MANUFACTURING CO.
Dept. M135 3775 N. Holton St., Milwaukee, Wis.

I enclose 10c (stamps or coin), for which please send me one copy of "Practical Delta Projects". Also place me on your mailing list to receive 1935 Delta catalog of quality motor-driven woodworking tools.

Name...Age?..........

Address...

City...State.................

☐ Check here if you are a Delta user now.

PRICE 15 CENTS
(20 CENTS IN CANADA)

JANUARY
1935

MODERN
MECHANIX
AND INVENTIONS

Volume XIII
Number 3

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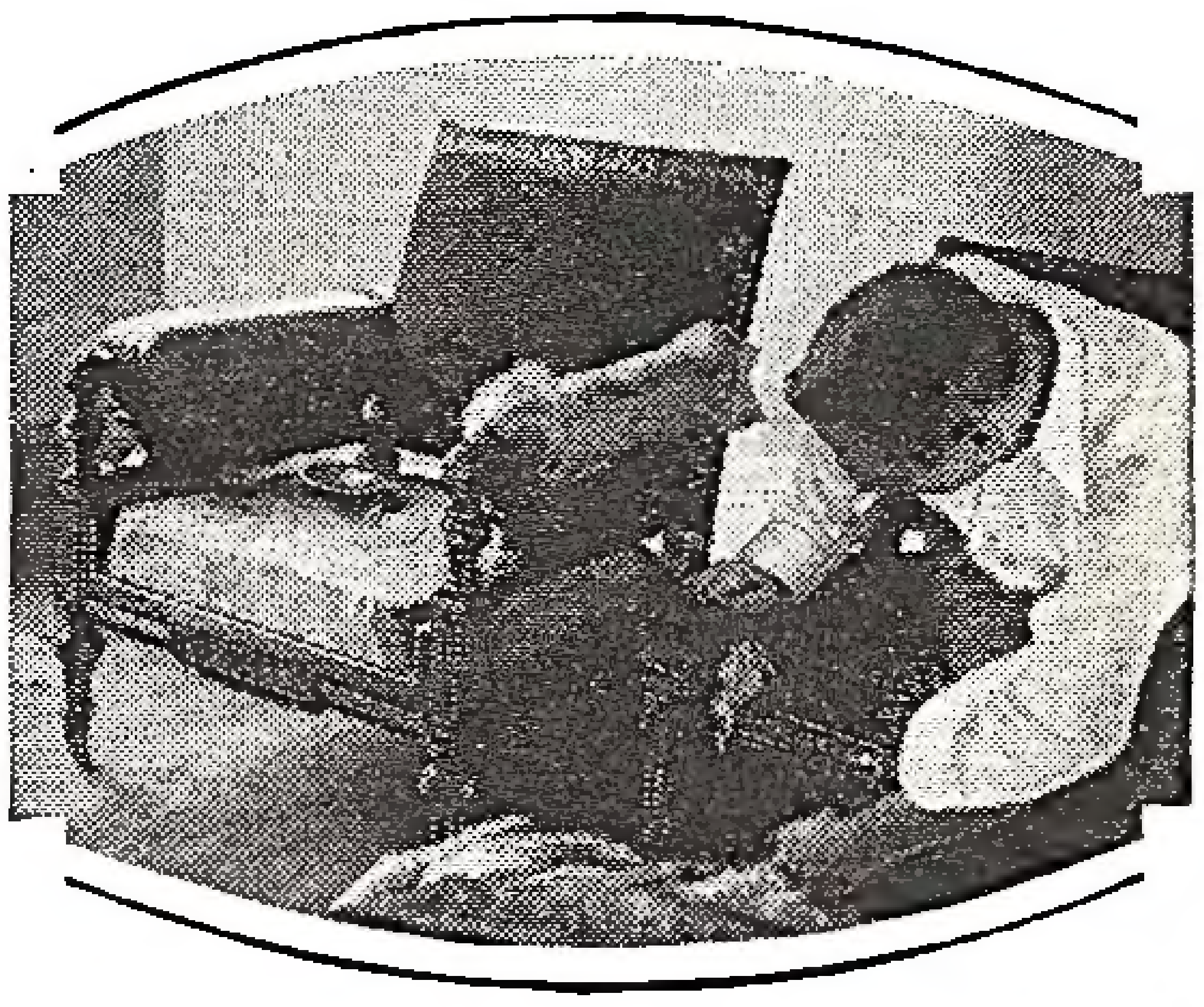
Big $500 Contest!



Have you a new idea for restoring old furniture? Modern Mechanix and Inventions offers a total of $500 in cash for home improvement suggestions.

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William J. Kostka
Editor

A. Neely Hall
Workshop Expert

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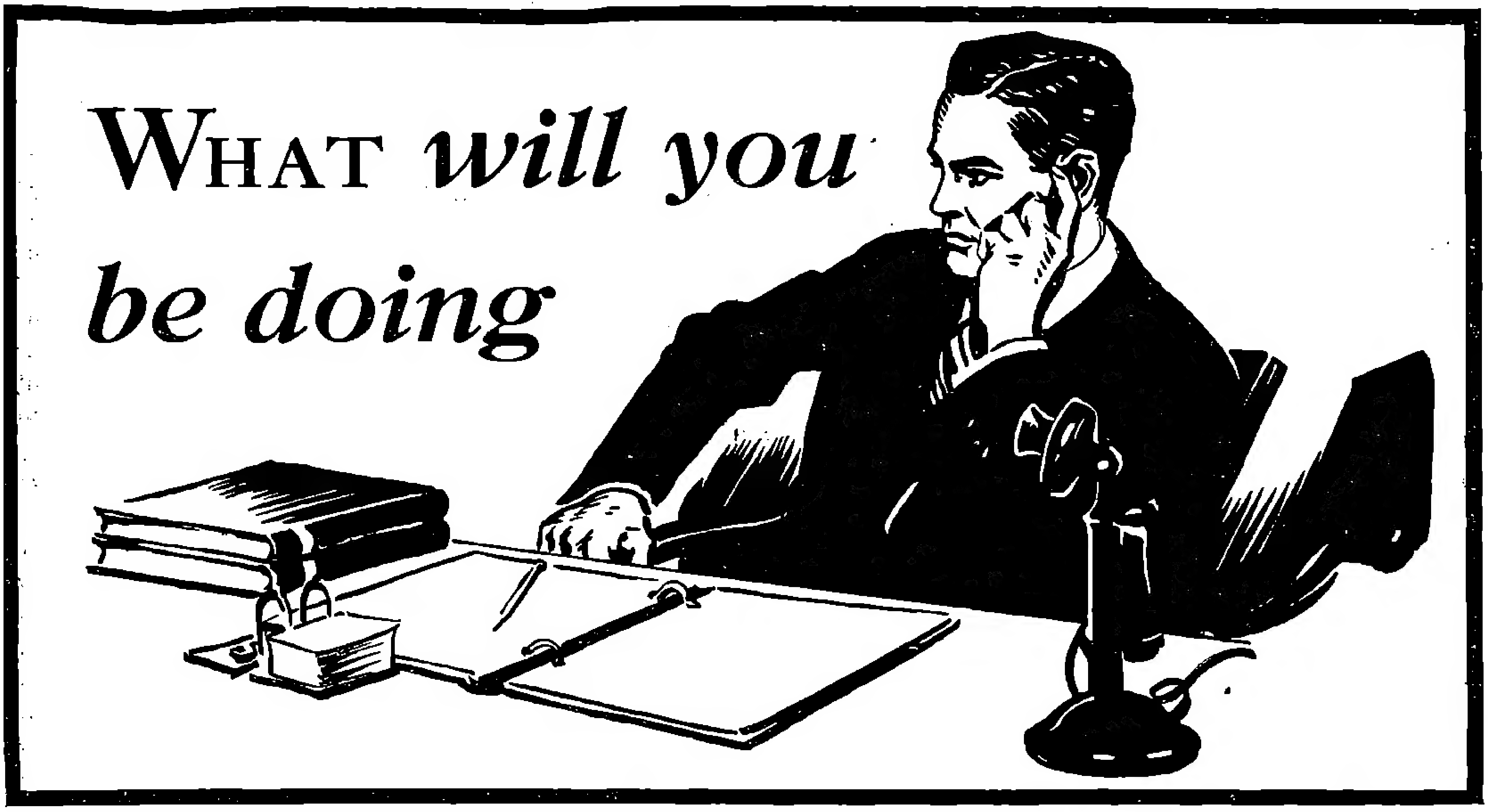
Robert Page Lincoln
Hunting and Fishing Editor

S. S. Rabl
Naval Architect



WHAT *will you be doing* ONE YEAR *from today?*

THREE hundred and sixty-five days from now—what?

Will you still be struggling along in the same old job at the same old salary—worried about the future—never able to make both ends meet?

One year from today will you still be putting off your start toward success—thrilled with ambition one moment and then cold the next—delaying, waiting, fiddling away the precious hours that will never come again?

Don't do it, man—don't do it.

There is no greater tragedy in the world than that of a man who stays in the rut all his life, when with just a little effort he could advance.

Make up your mind today that you're going to train yourself to do some one thing well. Choose the work you like best in the list below, mark an X beside it, and without cost or obligation, at least get the full story of what the I. C. S. can do for you.

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☐ Patternmaker
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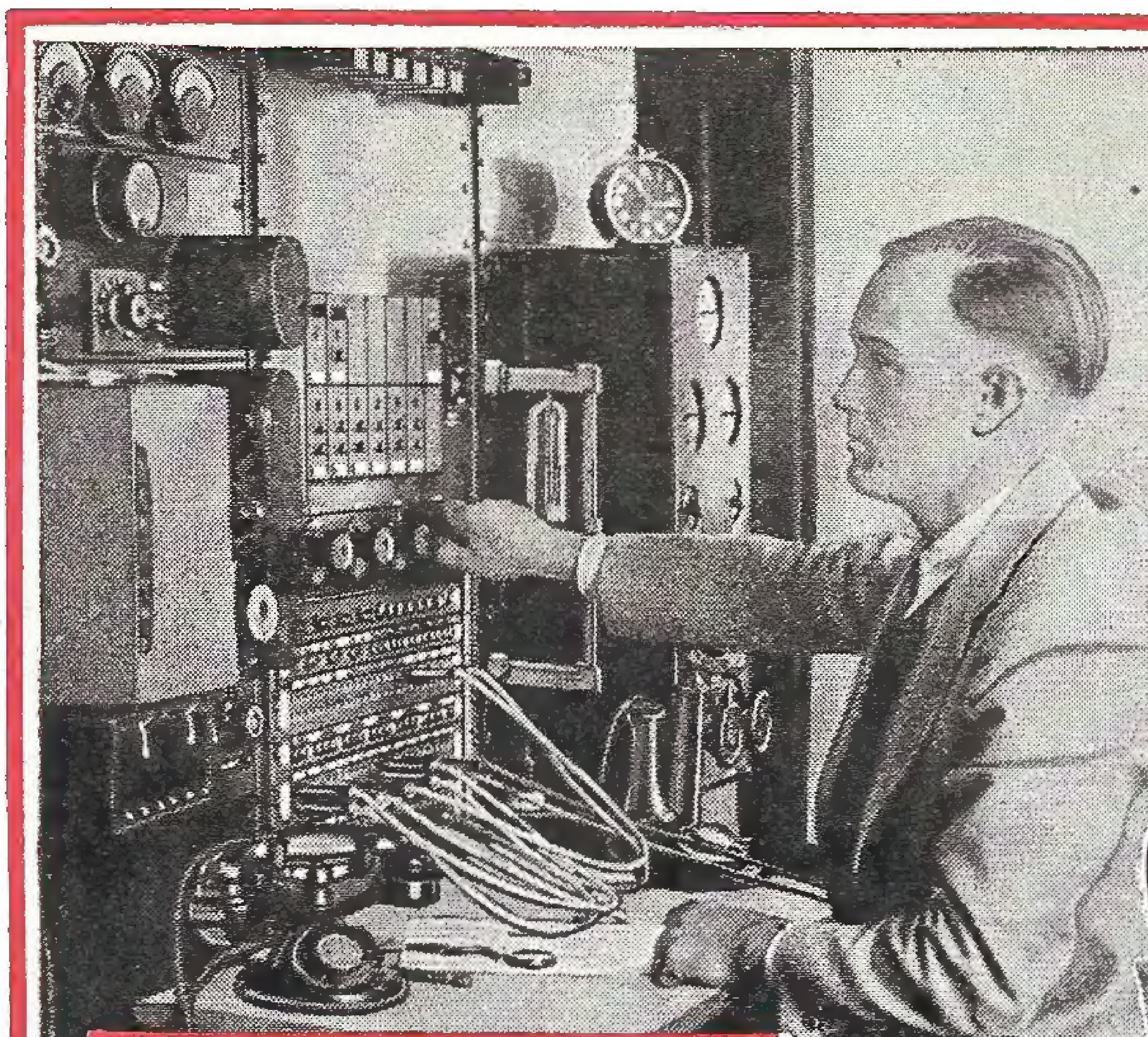

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Pres. National Radio Institute
The man who has directed the Home Study Training of more men for the Radio industry than any other man in America.

If you are dissatisfied with your present job—if you are struggling along in a rut with little or no prospect of anything better than a skinny pay envelope—Clip and Mail the Coupon NOW! Get my big 64-page FREE BOOK on the opportunities in Radio. Read how quickly you can learn at home in your spare time to be a Radio Expert—what good jobs my graduates have been getting—real jobs with real futures.

Real Opportunities Ahead in Radio for Trained Men

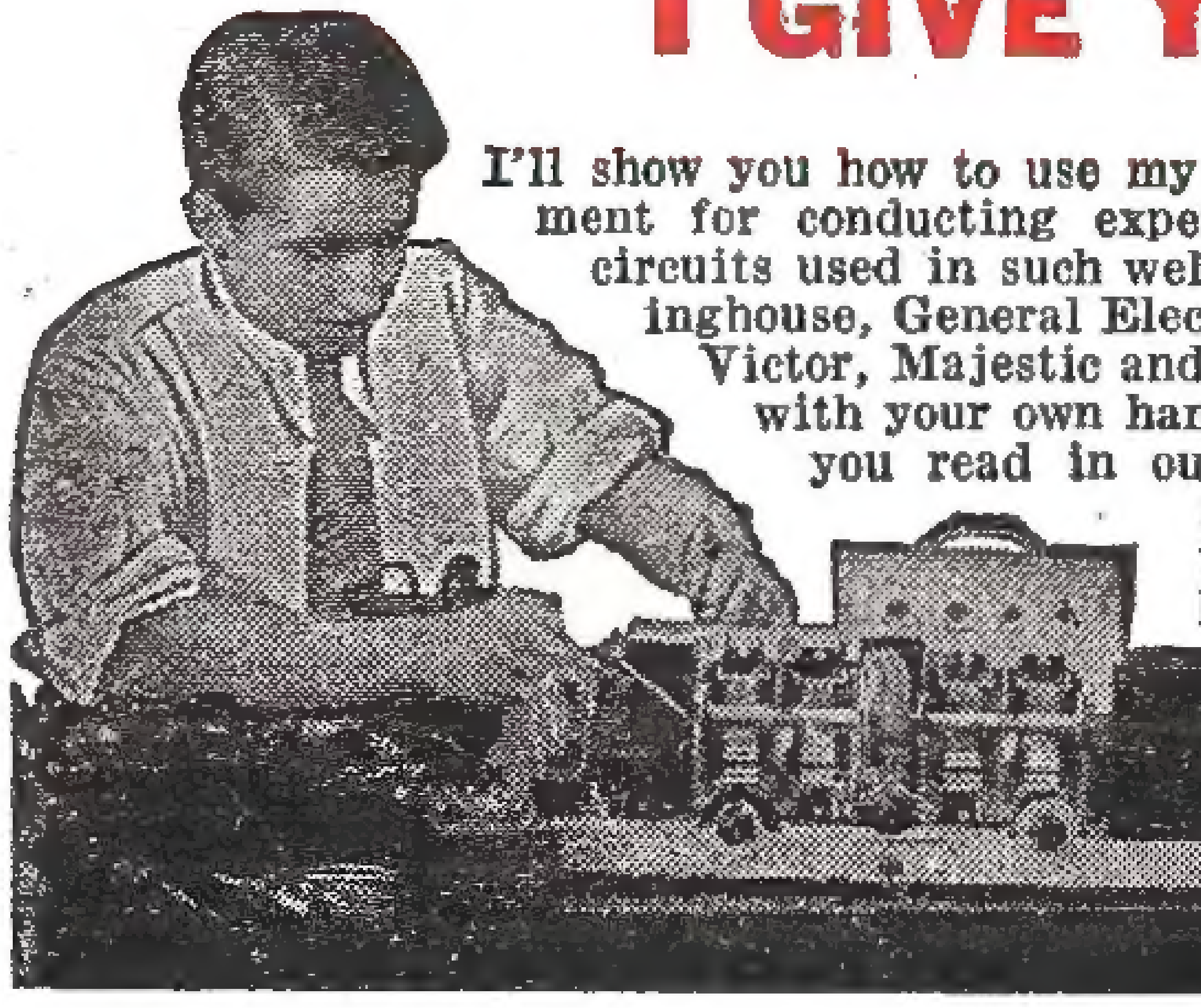
It's hard to find a field with more opportunities awaiting the trained man. Why in 1933—one of the worst depression years—the Radio industry sold $213,000,000 worth of sets and parts! Radio set sales INCREASED 45%—tube sales INCREASED 25%! Over 300,000 people worked in the industry! It's a gigantic business, even in the worst business years. And look what's ahead! Millions of sets are going out of date annually. 18,000,000 sets are now in operation on which over $200,000,000 are spent EACH YEAR for repairs, servicing, new tubes, etc. Broadcasting stations pay their employees (exclusive of artists) approximately $23,000,000 a year. Advertisers pay 600 great Broadcasting Stations over $75,000,000 a year for Radio time and talent. A few hundred jobs that paid $40, $60, $75 a week 20 years ago have grown to thousands. These figures are so big that they're hard to grasp. Yet they're all TRUE! Here's a new industry that has grown to be a commercial giant! No wonder great business leaders predict a brilliant future for the great and growing Radio industry.

Broadcasting Stations
Employ managers, engineers, operators, installation and maintenance men for jobs paying up to $5,000 a year.

Loud Speaker Apparatus
Installation and service work is another growing money-making field for trained Radio men.

Set Servicing
Spare time set servicing pays many N.R.I. men $5, $10, $15 a week extra. Full time men make as much as $40, $60, $75 a week.

YOU GET PRACTICAL EXPERIENCE With RADIO Equipment I GIVE YOU



I'll show you how to use my special Radio Equipment for conducting experiments and building circuits used in such well-known sets as Westinghouse, General Electric, Philco, R. C. A.-Victor, Majestic and others. You work out with your own hands many of the things you read in our lesson books. This 50-50 method of training makes learning at home easy, interesting, fascinating, intensely practical. You learn how sets work, why they work and how to make them work.

Some of the Many Other Jobs N. R. I. Trains Men For

Radio Service Business of your own
Spare time Radio Service work
Retail Sales of Radio Sets and Equipment
Service Expert for Retail Stores
Broadcasting Station Operator
Aircraft Radio Operator
Ship Radio Operator
Loud Speaker Systems, Installation and Service
Auto-Radio Installation and Service
Television Station Operator
Commercial Radio Station Operator
Short Wave Transmitter Installation and Maintenance
Designing and Building Testing Equipment
Service Expert with Radio Factory
All-around Servicing Expert

RADIO EXPERT

MAKE $40 $60 $75 A WEEK

at home • *Mail coupon for* FREE PROOF

Get Into This Field With a Future

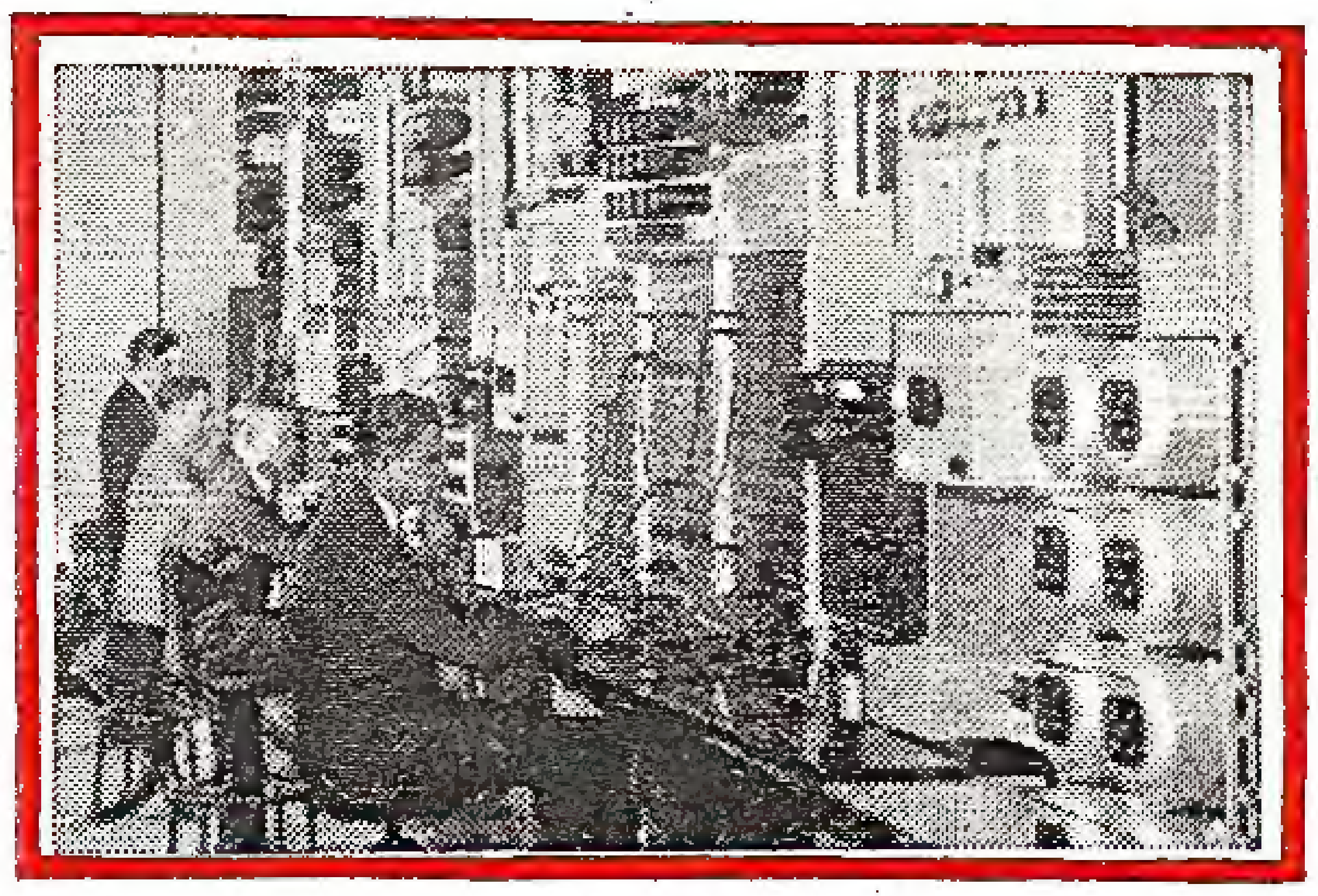
There's opportunity for you in Radio. Its future is certain. Television, short wave, police Radio, automobile Radio, loud speaker systems, aviation Radio, marine Radio—in every branch developments and improvements are taking place. Here is a real future for additional thousands of trained men who really know Radio. Get the Training that opens the road to good pay and success! Send me the Coupon NOW—and get full particulars on how easy and interesting I make learning at home. Read the letters from graduates who are today earning real money in this fascinating industry.

Learn at Home in Your Spare Time To Be a Radio Expert

Hold your job. There is no need for you to leave home. I will train you quickly and inexpensively in your spare time. You don't have to be a high school or college graduate. My Course is written in a clear, interesting style that most anyone can grasp. I give you practical experience under my 50-50 method of Training—one-half from Lesson Books and one-half from practical experience with equipment I give you. This unique and unequalled method has been called one of the greatest developments in home study Radio training.

Many Make $5, $10, $15 a Week Extra in Spare Time While Learning

My big 64-page book gives proof that many make $5, $10, $15 a week extra servicing sets in their spare time soon after enrolling. I give you plans and ideas that have made good spare time money—$200 to $1,000 a year—for hundreds of fellows. My Course is famous as "the one that pays for itself."



Money Back If Not Satisfied

I am so sure that N. R. I. can train you at home satisfactorily that I will agree in writing to refund every penny of your tuition if you are not satisfied with my Lesson and Instruction Service upon completing your Course. You'll get a copy of this agreement with my Book.

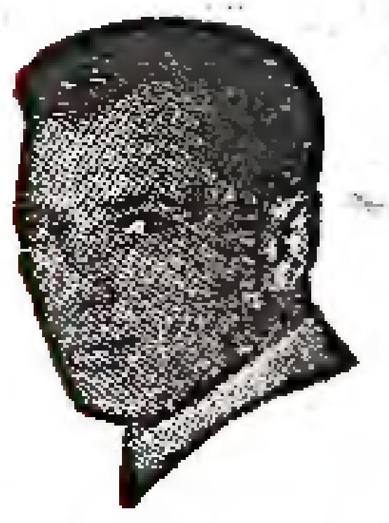
64-Page Book of Information Free

Get your copy TODAY. It's free to any ambitious fellow over 15 years old. It tells you about Radio's spare time and full time job opportunities; it tells you about my Course; what others who have taken it are doing and making. Find out what Radio OFFERS YOU—without the slightest obligation. MAIL THE COUPON in an envelope, or paste it on a penny postcard NOW.

J. E. SMITH, President
NATIONAL RADIO INSTITUTE
Dept. 5AH, Washington, D. C.

Clears $4,500 In 18 Months

"Before taking your Radio Course I was making $18 a week. I came here three years ago. In about 18 months I made about $4,500 in Radio. I cannot say too much for the wonderful help I have received from N. R. I."—NOEL W. RAY, 619 Broad St., Gadsden, Alabama.



Spare Time Work Pays $18 A Week

"I do only spare time Radio work and average $18 a week. People who in good times would buy a new Radio now have the old one fixed."—STEPHEN J. DRAPCHATY, 407 Wunderlich Avenue, Barberton, Ohio.

Now Owns Own Business

"If I had not taken your Course I would be digging ditches instead of running my own business. One week I made $75 on repairing alone, and this doesn't count sales. If a fellow wants to get into Radio, N. R. I. is the starting point."—R. S. LEWIS, Modern Radio Service, Pittsfield, Ohio.

Get the facts about THE TESTED WAY TO BETTER PAY

Rich Rewards in Radio

Mail Now For FREE 64 Page Book

J. E. SMITH, President
National Radio Institute, Dept. 5AH
Washington, D. C.

Dear Mr. Smith: Without obligating me, send your book which points out the spare time and full time job opportunities in Radio and your 50-50 method of training men at home in spare time to become Radio Experts.

(Please print plainly)

NAME...AGE........

ADDRESS..

CITY...................................STATE............

The Problems Editor answers reader queries on varied subjects.

ASCENSIONS WITH HOT AIR BALLOONS

Can safe ascensions be made with balloons which depend entirely upon hot air for their lifting power?—E. F., Montevideo, Minn.

Powerful hot air balloons can be built in the workshop having a sewing machine. Fireproof material is not suited for the covering because of its increased weight, but a good grade of unbleached muslin, with about 80x90 thread count has proved satisfactory. A pear-shaped balloon, 60 feet high and 40 feet in diameter is the type most commonly used to lift a man.

Hot air balloons can be regulated to come down safely at about the same rate of speed as a parachute. Because of the danger involved, ascension should not be attempted without a parachute. Kerosene is usually burned to supply the hot air.

BURNED-OUT XMAS LIGHTS

Is the practice of jamming tinfoil into Christmas tree light sockets when replacement bulbs are not available dangerous in any way?—R. S. M., Altoona, Ill.

As many as three sockets in the ordinary Christmas lighting circuit may be shorted out with tinfoil for a few hours, until new bulbs can be obtained, without apparent damage to the remaining lights. This practice is not recommended for any longer period, however, since voltage on the remaining bulbs is raised proportionately and their period of life shortened.

WHY DOES TOP WATER FREEZE?

If water at the surface of a lake is warmer than that near the bottom, why should ice always begin forming at the surface?—R.M.O., Atlas, Mo.

At temperatures above 39.2° Fahrenheit, colder water is always heavier, and sinks to the bottom of the lake. Below this critical temperature water exhibits one of nature's most remarkable phenomena, a given amount actually becoming lighter in weight as it is cooled further. As the temperature approaches the freezing point of 32° F., all of the cold lake bottom water has risen to the top, where it changes into ice.

REMEDY FOR SLIPPING CLUTCH

How can slipping be stopped in a motorcycle clutch? The flywheel is covered with brass and the drive wheel with 1/4" thick leather.—J.F.M., Altoona, Pa.

In most cases it is grease which causes slipping. If this hardened grease cannot be washed off with gasoline, try burning it by careful use of a blow torch. Talcum powder or pumice sprinkled lightly over the clutch face also proves helpful.

FREEZING HONEY FOR CONFECTION

Some time ago I noted in M-M a short article describing a frozen honey confection. Can you give me a recipe for preparing this?—M.S.H., Sault Ste. Marie, Mich.

A mixture of honey and water, with or without additional sweetening, is frozen as one would freeze a sherbet, then attached in lumps to a stick. The presence of the honey acts to prevent the formation of large ice crystals.

AUTO IGNITION PHENOMENA

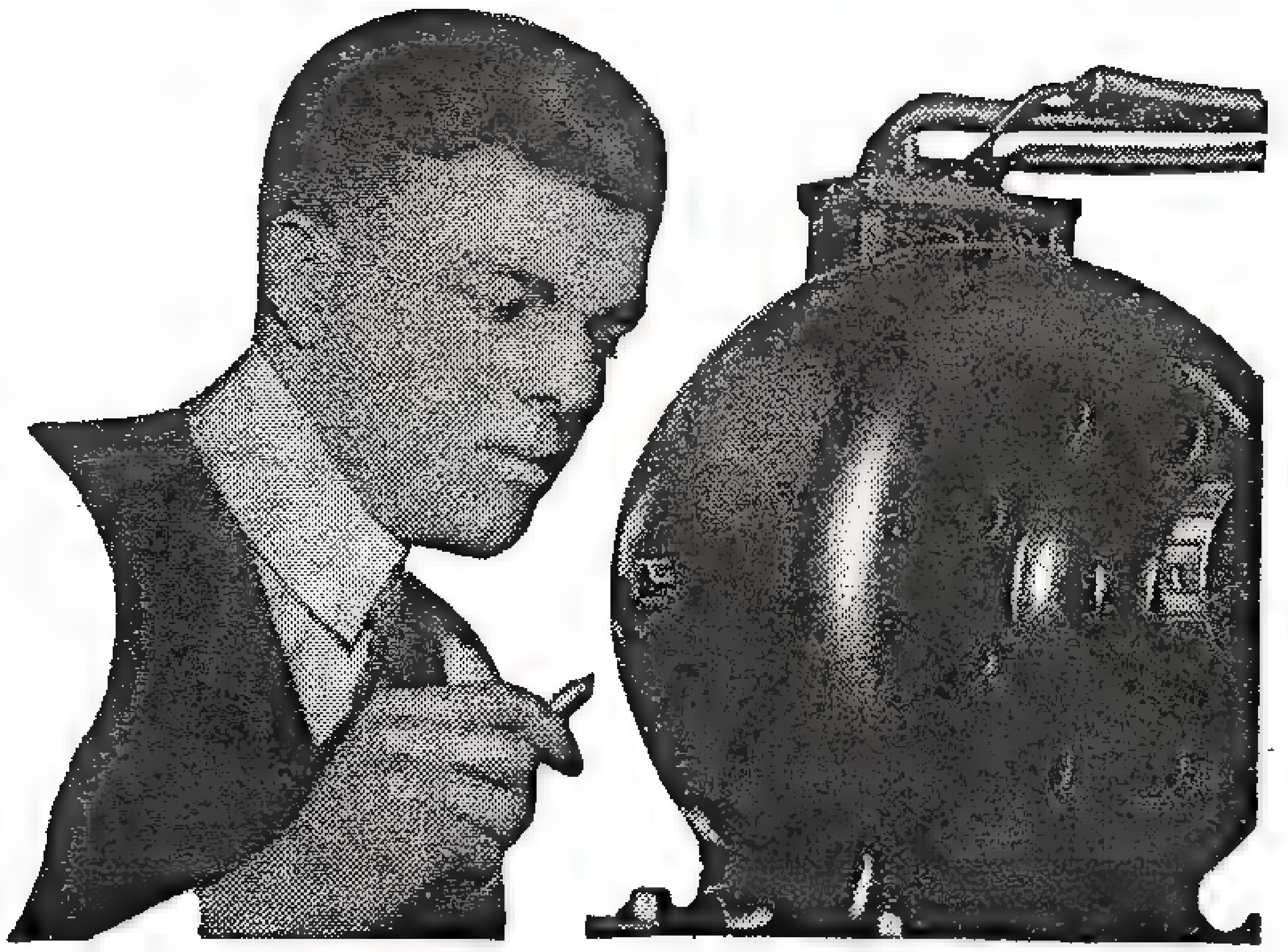
After running my auto engine for an hour with very little water in the radiator, I noticed that the engine ran for over a minute after the ignition was switched off. Was this engine running on the Diesel principle for that short interval, even though it is not a high compression motor?—E. W., Guys Mills, Pa.

With a reduced amount of water in the cooling system, it is very probable that the exhaust valves were operating at a red-hot temperature, and igniting the gasoline after ignition was cut off. This could hardly be compared to the operation of a Diesel engine, where gases are compressed to the point where they ignite themselves.

BULLETS MISS EMPTY EGG-SHELL

In Nic Sprank's Oddities of Science some time ago an item stated a marksman could not hit an empty egg-shell hung from a yard long thread, at

(Continued on page 14)



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Don't spend your life waiting for $5 raises in a dull, hopeless job. Now . . . and forever . . . say good-bye to 25 and 35 dollars a week. Let me teach you how to prepare for positions that lead to salaries of $50, $60 and up a week in electricity—NOT by correspondence, but by an amazing way to teach **right here in the great Coyne Shops** that makes you a practical electrician in 90 days! Getting into electricity is easier than you imagine for right now I am making an offer no other school ever dared to make. **PAY FOR YOUR TUITION IN EASY PAYMENTS AFTER YOU GRADUATE.**

LEARN BY DOING — IN 90 DAYS

BY ACTUAL WORK—In the Great Coyne Shops

I don't care if you don't know an armature from an air brake—I don't expect you to! It makes no difference! Don't let lack of money stop you. Most of the men at Coyne have no more money than you have. That's why I have worked out my astonishing offers. Mail coupon below for all the facts.

EARN WHILE LEARNING

If you need part-time work to help pay your living expenses I'll help you get it and when you graduate I'll give you lifetime employment service. And, in 12 brief weeks, in the great roaring shops of Coyne, I train you as you never dreamed you could be trained . . on one of the greatest outlays of electrical apparatus ever assembled . . real dynamos, engines, power plants, autos, switchboards, transmitting stations . . everything from door bells to farm power and lighting . . full sized . . in full operation.

ELECTRICAL REFRIGERATION

Right now I am including my big new Electrical Refrigeration Course. I train you on real electrical machinery . . . building real batteries . . . winding real armatures, operating real motors, dynamos and generators, wiring houses, etc.

GET THE FACTS

Coyne is your one great chance to get into electricity. Every obstacle is removed for you don't have to pay for your tuition until after you graduate then you have ten months to pay it in small payments starting 2 months after you graduate. This school is 33 years old—Coyne training is tested—proven beyond all doubt—endorsed by many large electrical concerns. You can find out everything absolutely free. Simply mail the coupon and let me send you the big, free Coyne book of 150 photographs . . . facts . . . jobs . . . salaries . . . opportunities. Tells you how many earn expenses while training and how we assist our graduates in the field. No obligation to you. So act at once. Just mail coupon.

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Send for my big book containing 150 photographs telling the complete story—absolutely FREE. **H. C. LEWIS, President**

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COYNE ELECTRICAL SCHOOL, H. C. Lewis, Pres.
500 S. Paulina Street, Dept. 15-53 Chicago, Illinois

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10 WEEKS

BY ACTUAL WORK ON REAL EQUIPMENT

PAY

FOR YOUR TRAINING IN *SMALL MONTHLY PAYMENTS*

AFTER YOU GRADUATE

Come to Coyne now! Get your training in the World's most fascinating, best paid profession. I train you at Coyne in a practical way so you can **be prepared to take a real job** and cash in quickly, and, I'LL FINANCE YOUR TRAINING. Two months after you are trained you can start paying me back in easy monthly payments from your earnings. Take over a year to pay AFTER training. Mail the coupon **today** for details of this plan.

REAL OPPORTUNITIES FOR THE RADIO TRAINED MAN

Prepare for jobs as Designer, Inspector and Tester—as Radio Salesman and in Service and Installation—as Operator or Manager of a Broadcasting Station—as Wireless Operator on a Ship or Airplane—as a Talking Picture or Sound Expert—HUNDREDS of Opportunities for fascinating, WELL PAID JOBS!

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Talking Pictures, and address systems offer great opportunities to the trained man. Television is the great new branch of Radio which is now being developed very rapidly. Be ready for your chance in Television. At **Coyne** you are trained on real Talking Picture and Television equipment.

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So that my graduates may have an all around training which increases their earning capacity, I am including for a short time my big new course in **Electric Refrigeration** and **Air Conditioning.** Here is your chance to get a practical training in this great new field at no additional cost.

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Radio Div., COYNE Electrical School

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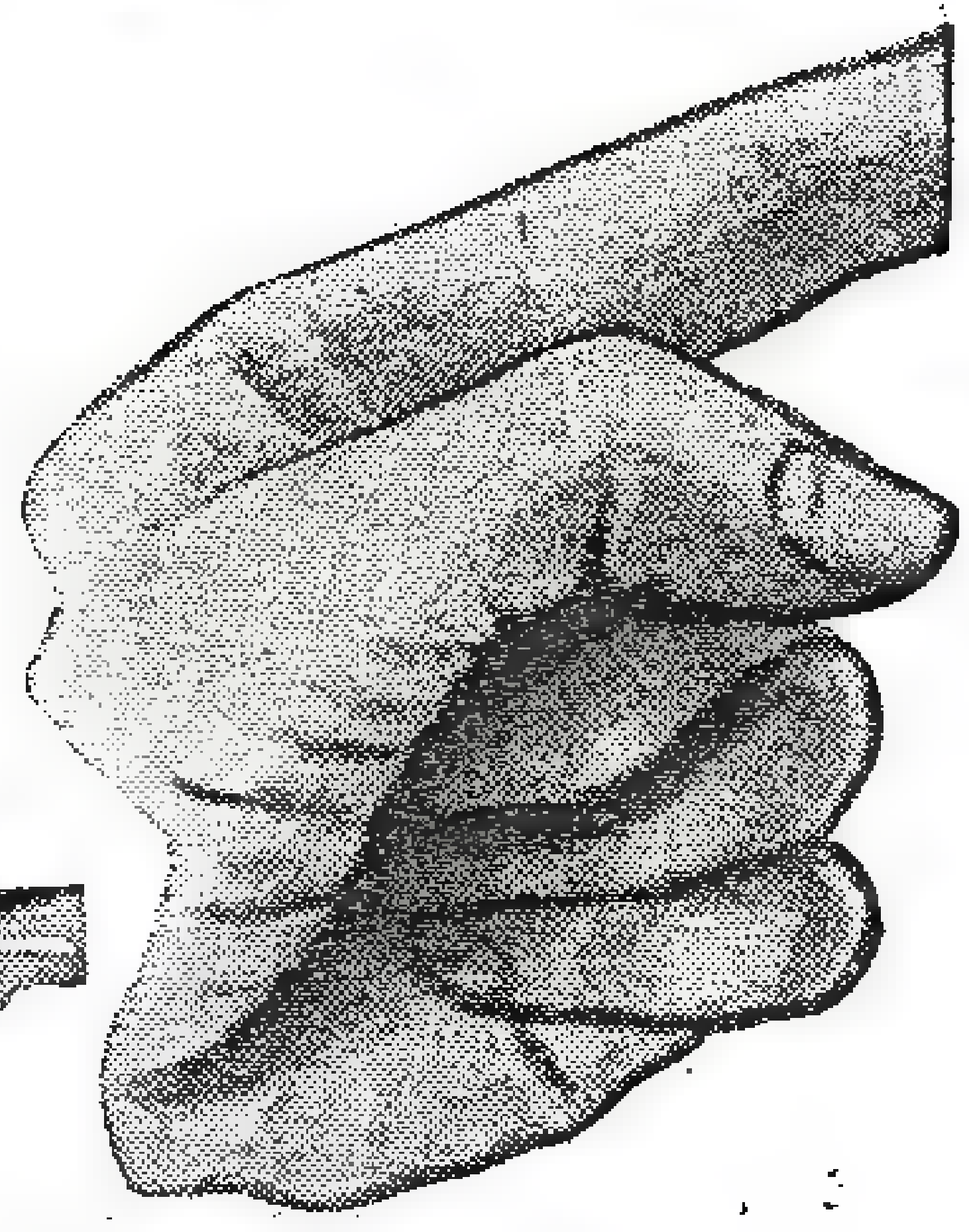
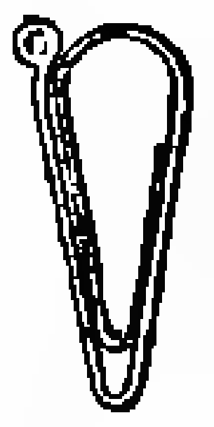
OTHER MEN Have Read and Profited by this Free Book ABOUT



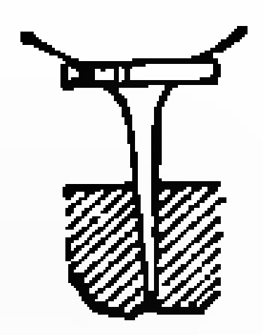
MANY LITTLE IDEAS HAVE BIG COMMERCIAL POSSIBILITIES

The Paper Clip



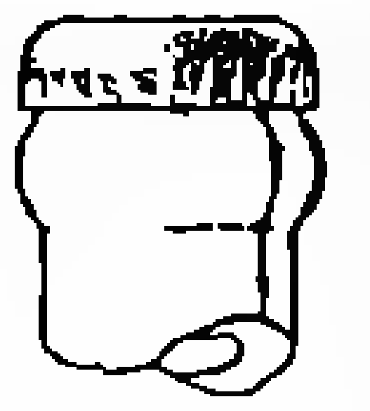
Often some simple, little article will prove to be a big commercial success. Take an ordinary paper clip; just a piece of twisted wire, yet they are sold by the millions every year.

Wooden Golf Tee



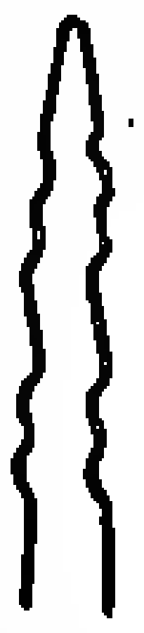
Another little article now used by thousands is the wooden golf tee. For years golfers made their tees with clay or wet sand. Then a man had a hunch to make a tee of wood. The idea was worth a fortune.

Metal Bottle Cap



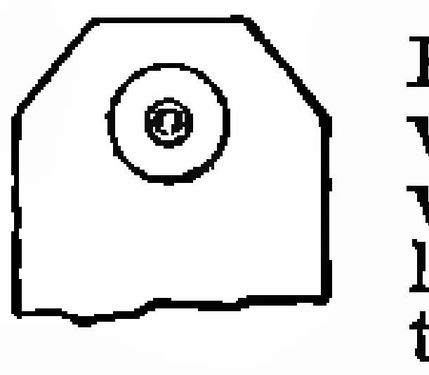
Here's the ordinary metal bottle cap, used on beer and soft drink bottles. Its inventor, William Painter of Baltimore, built a big business and became wealthy with this simple idea.

Hair Pin



One day a husband noticed his wife bend her hair pins to make them stay put. That gave him the idea for hair pins with kinks. He patented the idea and is said to have reaped tremendous profits.

Shipping Tag



Before Dennison invented a shipping tag with a reinforced eyelet, tags gave much trouble because they pulled off the strings intended to hold them in place. Yet see how simple Dennison's idea was. This is another little article which became the basis for a very large business.

THIS book was prepared for men of ideas—men who have an article in mind that will make money, save money, save labor or give pleasure. Leading thinkers agree that the opportunity for the inventor is as great today as ever before—that the world of a few years from now will be radically different from the world of today because of the contributions to progress that inventors will make. Now is the time—if you have an invention—to see about fully protecting it so that you can be sure of your just share of whatever profits it may make.

C. F. KETTERING

Vice Pres., General Motors Says This About Invention

In statement in Good Housekeeping Magazine, Charles F. Kettering, who helped develop the self-starter, Duco, and other important inventions, said: **"Our return to normal times depends on new manufactured products that will catch the purchaser's eye, get him to buy and start the ball rolling. Change and buying go together. We're only entering the great period of inventive advancement."**

Improvements Can Be Patented

Don't think that to be profitable an idea needs to be complicated. Simple articles—like those shown here at the left—have often proved profitable. Also improvements on patented articles sometimes are more valuable than the original article itself. If you have an invention—at least see what its possibilities may be and HOW YOU CAN PROTECT YOUR OWN RIGHT TO IT.

Don't Delay—Send for this Free Book Now

Many a man has waited until too late to protect an invention by means of a United States Patent. Remember that someone else may be thinking along the same lines that you are; and the Patent Laws place the burden of PROOF on the man who files his Patent Application last. You may have much to gain—and nothing to lose—by acting promptly. Learn the important facts about Patent Protection at once.

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PATENTS

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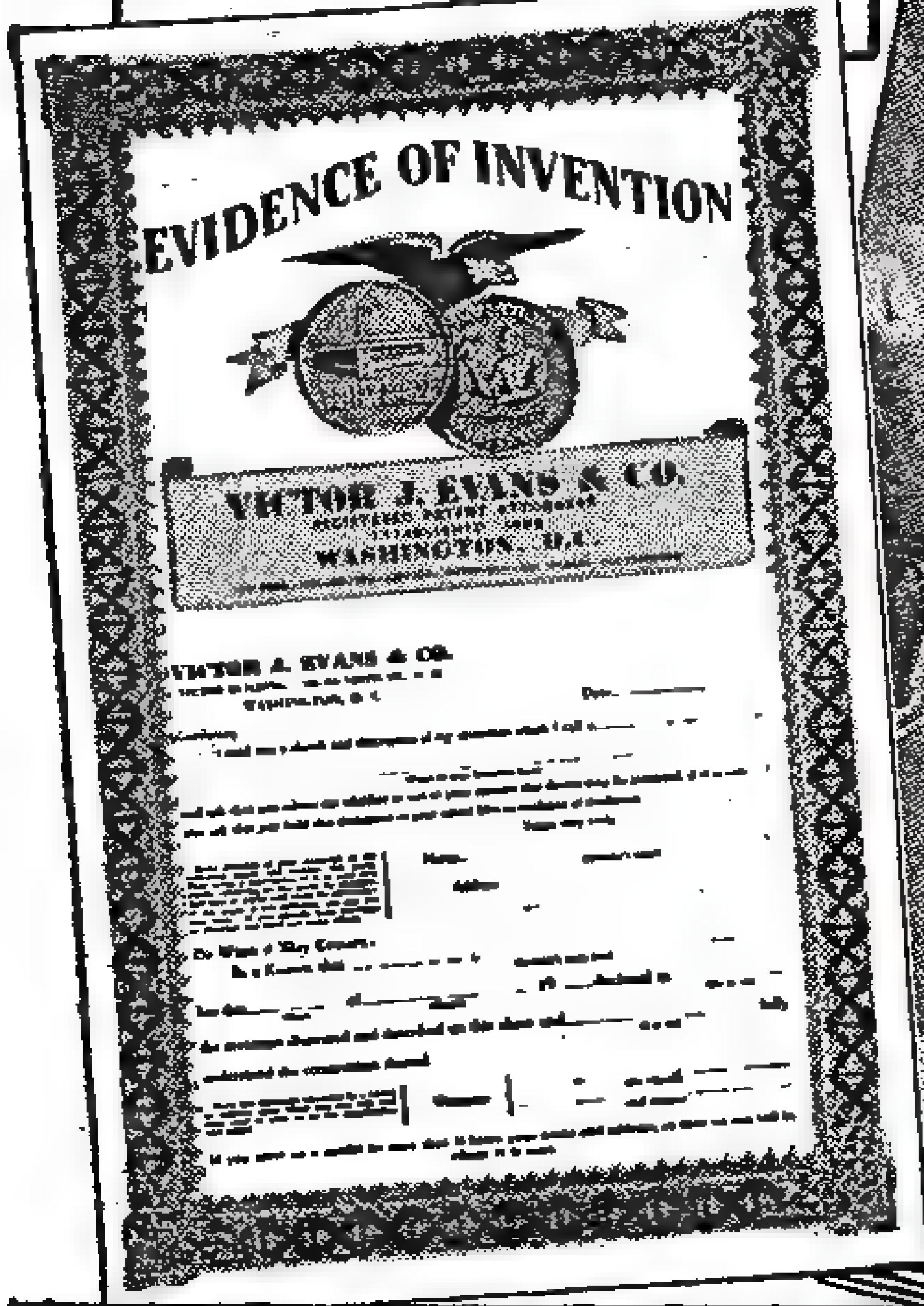
« A BOOK FOR INVENTORS »



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This Book TELLS YOU:

How the Patent Laws protect you and why, if you have an invention, you need a Patent at all.
What to do to make application for a Patent; just what information a Patent Attorney needs to help you.
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Back-Geared, Screw Cutting Precision Lathes

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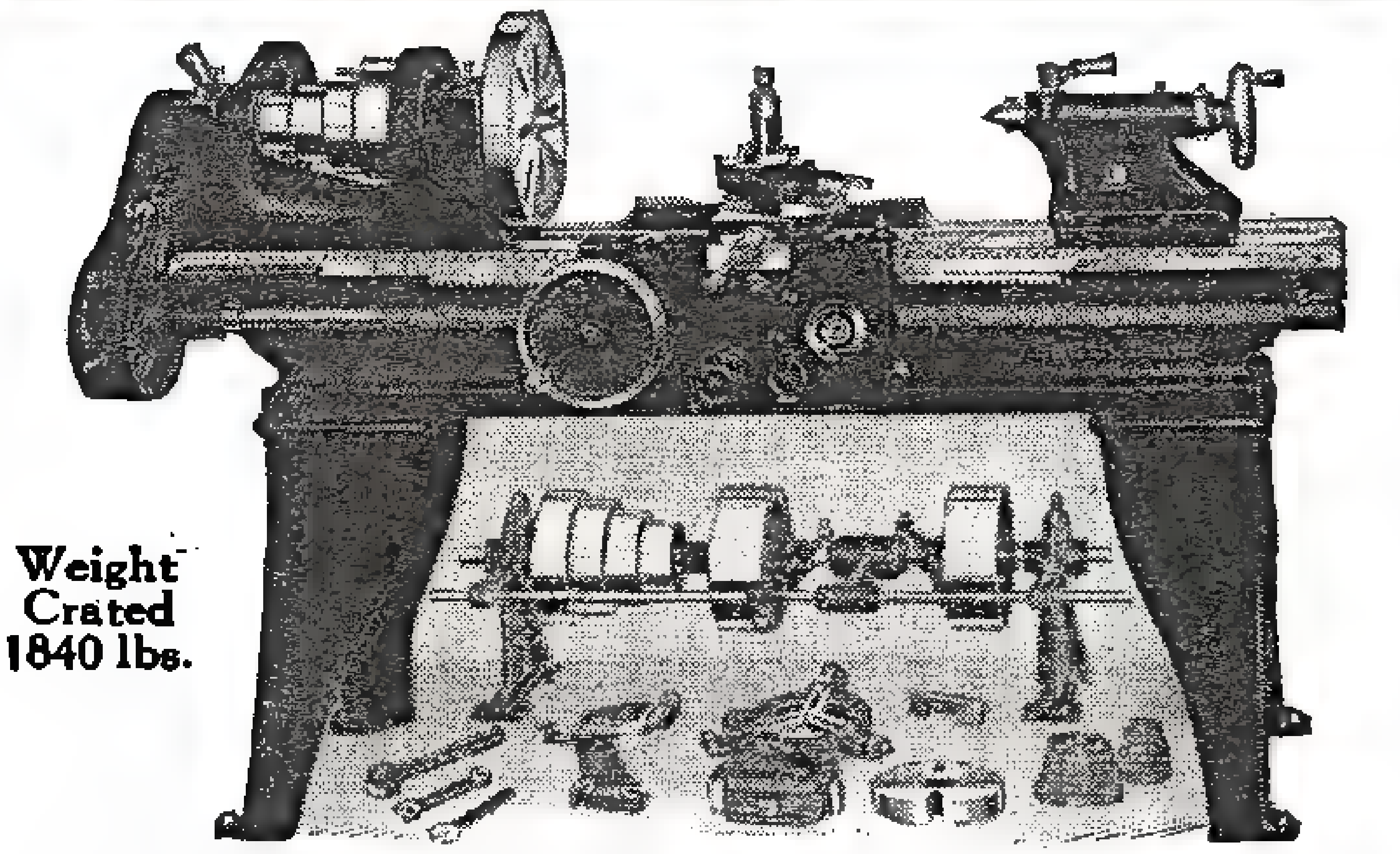

Weight Crated 1840 lbs.

16″ x 6′ Standard Change Gear Lathe with Countershaft and Complete Equipment as shown......... $480

$100 Down—$29 per month for 14 months

96 SIZES OF LATHES $75 to $1500

IF YOU have work for a lathe, why be without it when a small down payment will place the lathe in your shop immediately. Before you consider a second-hand lathe, with perhaps many attachments missing, look up the prices of a new South Bend Lathe. You deal direct with the factory and make your payments directly to us. "Satisfaction guaranteed or your Money Back." 96 sizes and types of Lathes with Countershaft and Motor Drive available. Below are listed a few popular sizes.

Size of Lathe (Countershaft Drive)	Cash Price	Down Paym't	Monthly Paym't
9′ x 3′ Workshop Bench Lathe	$ 85.00	$ 21.00	$ 7.00
9″ x 3′ Toolmaker Bench Lathe	140.00	31.00	9.00
9″ x 3′ Junior Bench Lathe	170.00	35.00	11.50
9″ x 3′ Std. Change Lathe	235.00	50.00	17.00
11″ x 4′ Std. Change Lathe	300.00	60.00	19.50
13″ x 5′ Std. Change Lathe	352.00	75.00	25.00
18″ x 8′ Std. Change Lathe	635.00	125.00	34.00

WRITE for a quotation and illustration of the size you are interested in. Let us know the kind of work you wish to do and we will recommend the size and type of lathe practical for your shop, with itemized quotation on equipment recommended. No charge for this service.

NRA

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Send 10c for catalog including complete instructions for building your telescope

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"MARVEL" POLICE ADAPTER
TO DETECTOR TUBE
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GETS AMATEUR AND SHORT WAVE CALLS ON ANY RADIO SET
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Get surprises on radio lead-in and aerial wire; ground clamps; window leads; Vernier dials; radio knobs; auto antennae; push-back wire and shielded wire.

SPECIALTIES MANUFACTURING CO.

3836 Grand River Ave. Detroit, Mich.

Problems Editor Answers Queries

(Continued from page 10)

a distance of 50 feet. Using a .22 caliber long rifle bullet at a distance of 75 feet, I put a hole right through the center of the shell. Could you tell me why it was possible to make this shot?—E.W.H., San Francisco, Cal.

A bullet traveling at high speed pushes a certain quantity of air ahead of it; this air, hitting the light egg-shell in advance of the bullet itself, will push the shell to one side. With a direct hit such as was made in the above case, the shell is pushed straight back instead of to one side, but not enough to dodge the bullet.

OVER-DATES ON COINS

I have a large copper U. S. cent in which the date numerals appear to have been changed from 1810 to 1811. Can you tell me how much this coin is worth?—F.V.R., St. Louis, Mo.

The same die from which the U. S. one cent pieces of 1810 were struck was used in 1811 by sinking a "1" over the "0". Though portions of the latter figure are still visible, the coins are considered as issues of 1811.

A prominent coin buyer is paying from 25c to $2.50 for this coin, depending upon its condition.

HOOKING UP CONDENSER MIKE

What size transformer should be used in hooking up a home-made condenser microphone to a radio set?—D.B., Colton, Cal.

Good results may be obtained by connecting the microphone in series with the primary of a standard 3-1 ratio audio transformer and a 45-volt B battery. The transformer secondary is connected to the grid and cathode of your radio set or to the input terminals in the event that an amplifier is being used.

AUTO GOES FASTER WHEN COLD

My 1922 Dodge car will make 60 m.p.h. in the morning, but after driving for about two miles, I cannot get it to go faster than 45 m.p.h. Although there is no steaming, the water rumbles in the engine itself. Can you suggest a remedy?—Y.L., Lewaren, N. J.

If compression before the car is started is considerably better than after the car has been driven a few miles, the trouble is undoubtedly due to warping of the exhaust valves with heat. The valves will seat properly when the engine is cold because they were ground at that temperature. The remedy is new valves of the heat-resistant type.

SHRINKING CLOTH ON FRAME

Is there a solution available at a reasonable price which, when applied to cloth stretched over a frame, will cause it to shrink?—E. W., Guys Mills, Pa.

Ordinary airplane dope, sold by all aviation supply houses, will shrink cloth without reducing its strength.

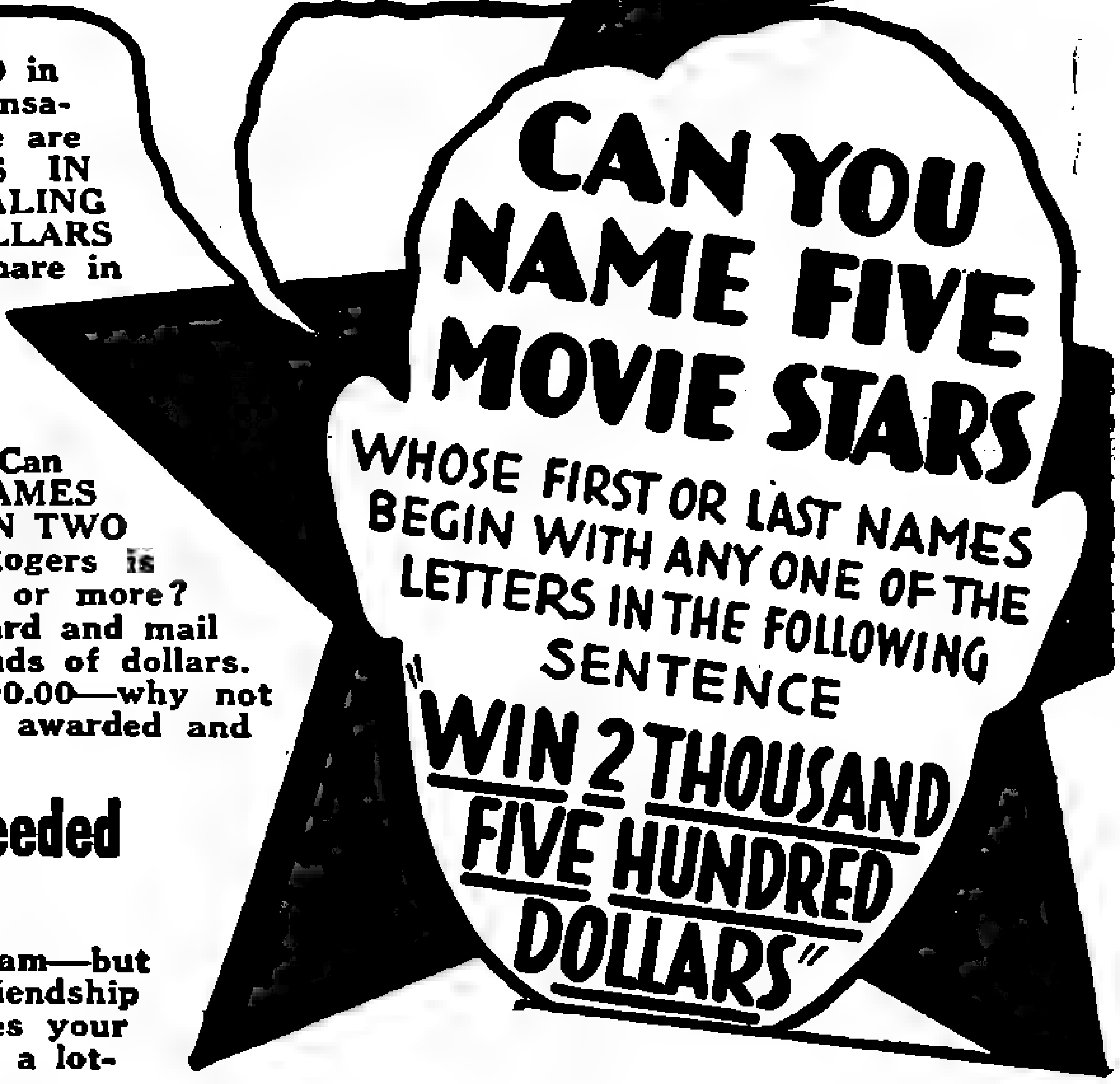
(Editor's Note—All letters sent to this department should include a stamped, addressed envelope. Write to M-M Problems Editor, 529 South 7th Street, Minneapolis, Minn.)

HUNDREDS HAVE WON BIG CASH PRIZES WOULD YOU, TOO, LIKE TO

WIN $2,500.00

OR BUICK AND $1,000.00

Do you want money?—a small fortune?—$2,500.00 in real cash? Here's your opportunity. This is our sensational way to advertise and extend our business. We are actually distributing THOUSANDS OF DOLLARS IN CASH—MODEST FORTUNES—CASH PRIZES TOTALING OVER $5,000.00—BESIDES THOUSANDS OF DOLLARS IN EXTRA CASH PROFIT REWARDS. You may share in this cash. Would you like to win $2,500.00 all cash or Buick and $1,000.00?


CAN YOU NAME FIVE MOVIE STARS
WHOSE FIRST OR LAST NAMES BEGIN WITH ANY ONE OF THE LETTERS IN THE FOLLOWING SENTENCE
"WIN 2 THOUSAND FIVE HUNDRED DOLLARS"

Can You Name 5 Movie Stars?

DON'T SEND A CENT — JUST DO THIS NOW! Can you name 5 Movie Stars whose FIRST OR LAST NAMES begin with any letter in the following sentence: "WIN TWO THOUSAND FIVE HUNDRED DOLLARS." Will Rogers is one. Norma Shearer is another. Can you name 5 or more? Write the names in coupon below or on penny postcard and mail quick and learn how you may share in these thousands of dollars. No prize less than $5.00 cash. Someone wins $2,500.00—why not you? In case of final ties, duplicate prizes will be awarded and paid.

Not a Cent of Your Own Money Needed on Our Clever Plan

Maybe this grand opportunity sounds like a dream—but hundreds have already won prizes in Bonnie Day friendship campaigns. Here are pictures of a few. Now comes your chance. No subscriptions to buy or sell. This is not a lottery. No luck needed. No slogans to write. No more puzzles. Imagine the joy of winning $2,500.00!

I WON $6,230.00
MR. SCHUETZE N.Y. N.J.

I WON $1,980.00
E.G. TESMER MIN.

I WON $5,400.00
G. GIEBINK MICH.

Cash for Everybody

Who Takes an Active Part

Not only one person but everybody who answers has an opportunity to receive cash returns. The more the merrier. You can be sure to receive cash if you take advantage of my unique plan. I want quick advertising — quick action — and I'm willing to pay for it. Think of the joy of winning $2,500.00. More money in one lump than most people save in a lifetime. Mail coupon now!

$1,000.00 EXTRA

to First Prize Winner for Promptness

They say promptness pays! I will award $1,000.00 extra to the First Prize Winner just for promptness in following my plan. Do you want it? I want QUICK ACTION!

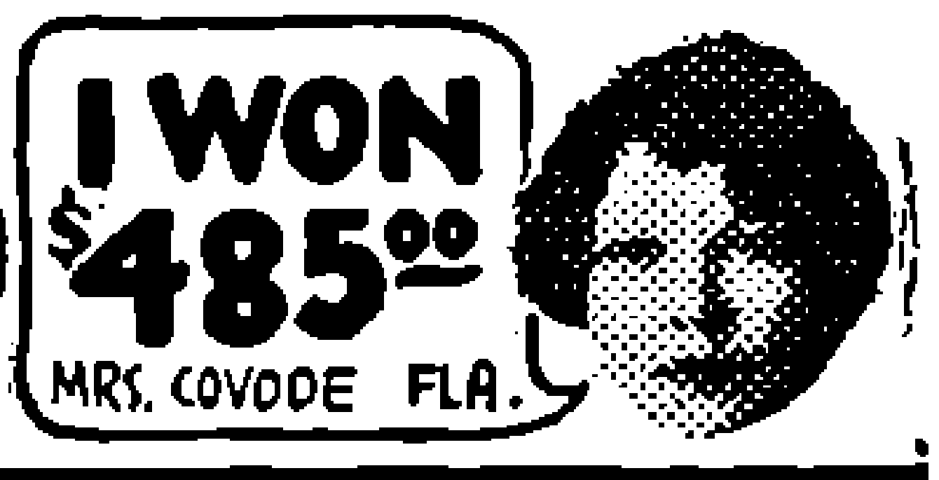
$10,000.00 REWARD

will be paid to any worthy charity if anyone can prove that we do not really award all these thousands of dollars in Grand Prizes—or if money to pay same is not in Bank—or if we will not fulfill every Guarantee we make to you.

DON PARMELEE, Prize Mgr., Dept. 236
112 to 114 Eleventh St. Des Moines, Ia.

I WON $1,750.00
EDNA HOXEY ILL.

I WON $1,140.00
MR. GUSTAFSON IND.



NO CONNECTION WITH ANY OTHER FIRM OFFERING PRIZES

All Grand Prize Money Now in Bank

The money to pay every Grand Prize winner is deposited in the Home Savings Bank in Des Moines (assets over $1,500,000.00). We are a reliable firm. I invite you to look us up through any credit agency, any bank in Des Moines, any business house, railroad, express company, magazine, newspaper. We are well known national advertisers.

Send No Money--RUSH COUPON

Many who won cash prizes in campaigns like this thought they didn't have a chance. Imagine their surprise when they won! Write names of Movie Stars in coupon or on penny post card. DON'T SEND A CENT. For replying I will tell you how you may share in thousands of dollars extra in cash profit rewards and win $2,500.00, too. Nothing to lose — everything to gain. Answer now.

Don Parmelee, Prize Mgr., Dept. 236
112 to 114 Eleventh St., Des Moines, Ia.
I have written Movie Stars' names below, and I am anxious to win.

My Name..

Address..

City..............................State..............

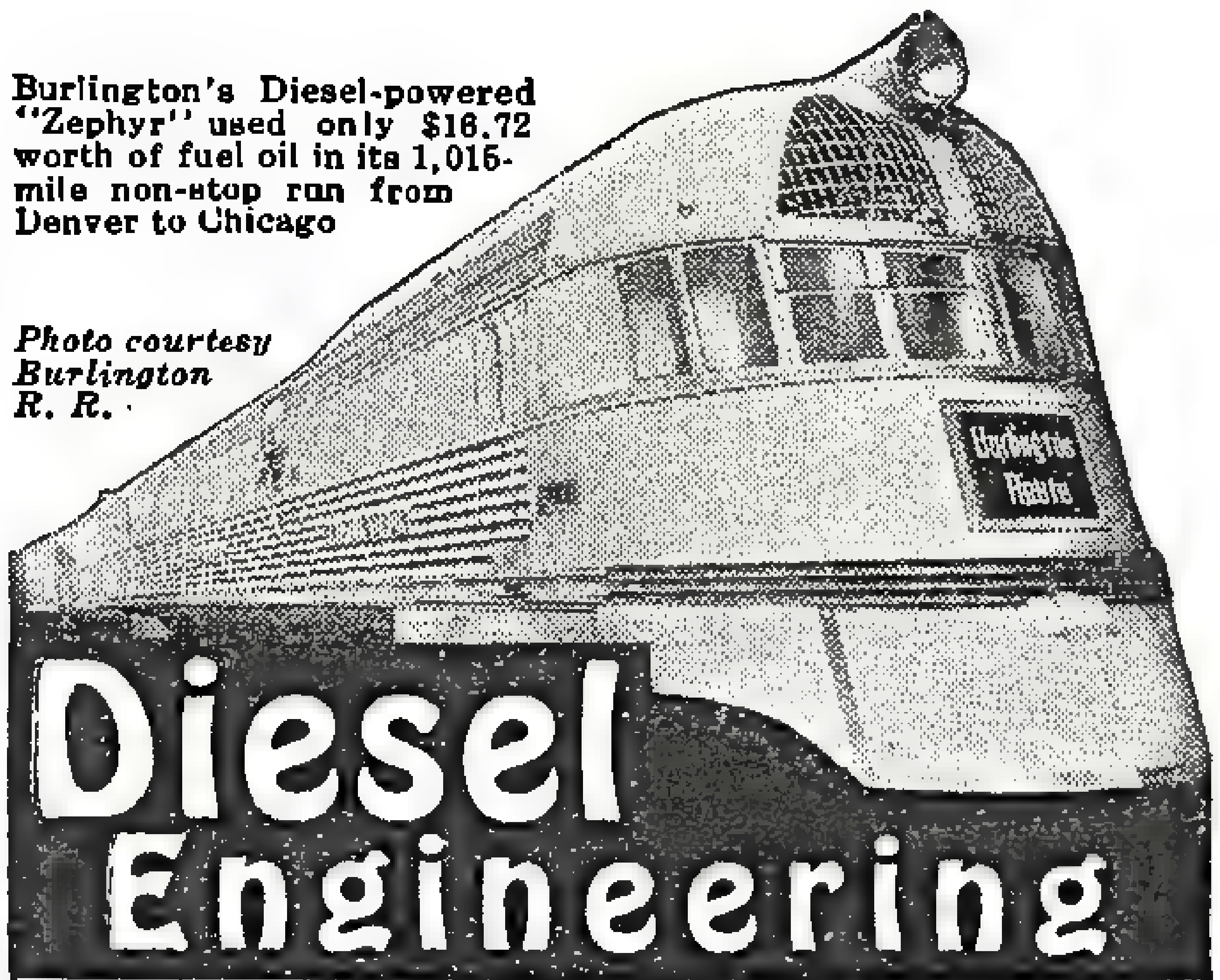
....

....

Mark in square below which you would prefer if you should become the First Prize Winner.
☐ $1,000 & BUICK OR ☐ $2,500 CASH

Burlington's Diesel-powered "Zephyr" used only $16.72 worth of fuel oil in its 1,015-mile non-stop run from Denver to Chicago

Photo courtesy Burlington R. R.



Diesel Engineering

The Diesel is **fast replacing old-type engines** in locomotives — ships — industrial and commercial power plants — motor cars and trucks — aircraft — tractors. As a result, **many old jobs have been greatly changed or actually wiped out.**

New Jobs For Old

Every industrial change throws many good jobs into the discard—but it creates more and better jobs. The **automobile** ruined scores of industries based on providing horse transportation — but the motor industry employs even greater armies of workers. **Radios** supplanted talking machines — **electric refrigerators** wrecked the iceman — **air conditioning** is driving out old-fashioned heating and ventilating systems.

Diesel Engineering is the great opportunity of today. The field is developing with amazing rapidity—on land and water and in the air. **This is your opportunity** to get in on the ground floor of a new and prosperous industry that will provide **plenty of good jobs** during your lifetime.

Is Your Job Safe?

There is a **growing scarcity of men** trained to install, operate, and service Diesel engines. New Diesel Engineering Course—**just released for home study** by one of America's leading educational institutions — will give you, in a short time, thorough training in modern Diesel engine practice. **All texts furnished.** Send TODAY for Free Bulletin. No obligation.

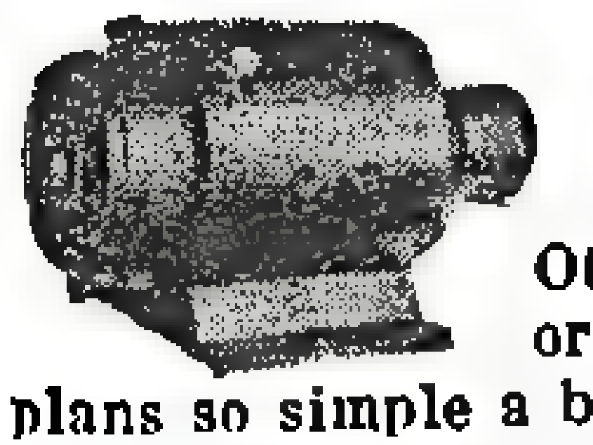
American School
Dept. D-128, Drexel Avenue at 58th St., Chicago, Ill.

BE TALL

Your Height Increased in 14 days or money back! The amazing Stebbing System soon brings 3-5 inches increase, new "pep" and energy. A valuable Health Course and "Success and Popularity" Course included FREE with System, sent complete for $2.00. Send for convincing Free Book with testimonials and Guarantee in plain sealed envelope. WRITE NOW TO:—

STEBBING SYSTEM
Dept. M. M. 10, FOREST HILLS, NEW YORK

MAKE YOUR OWN MOTORS



Model T Ford Generator makes ¼ H. P. Motor, reversible and variable speed up to 7000 R. P. M. Dodge 12 V Generator makes ½ H. P. Motor. Other Generators can be used. All operate on regular or 32 volt current. Complete, illustrated and tested plans so simple a boy can use. Regular price $2, now $1 for a limited time only. Be sure to mention kind of Generator and current. You can sell these motors at a nice profit. Money back if plans don't work.

RAND CO., Dept. 102, 2004 Grand Ave., Kansas City, Mo.

Easy to Play
Be Popular

What a thrill when you play your first tune, the very first week, on a P-A Sax. Then popularity . . admiring friends, good times, a glorious future. Try a new model P-A Sax, Trumpet, Trombone, Clarinet at your local music store, or write for beautiful literature. No obligation. Easy terms. Write today. 1144

PAN-AMERICAN
130 P-A Bldg., ELKHART, IND.

Moderate Price

DEVELOP and PRINT SNAPSHOTS YOURSELF

MAKE MONEY!

Make money—Save money—Make Better Pictures by Developing and Printing your snapshots at home. Make more prints from your old negatives. Learn a fascinating and well-paying profession with a Winner Photoset. Not a toy but a scientifically designed kit containing enamel trays, glass graduate, stirring rod, developer powders, fixing powders, printing frame, printing paper and reliable instruction book. Only $2.25 delivered in U. S. A.
De Luxe Set with professional type equipment for the more advanced worker...............$3.95

J. H. WINN MFG. CO.
Dept. 98 124 West 23 Street New York

Winner PHOTO-SET

LEARN TO DANCE AT HOME

LEARN THE LATEST BROADWAY STEPS

LEAD AND FOLLOW Correctly, Gracefully

This new, simple method teaches you quickly and easily. 20 DIFFERENT STEPS FOR ALL MODERN DANCES. TANGO, WALTZ. The modern FOX TROT. The dreamy WALTZ. The latest SOCIETY STEPS will make you HAPPIER, HEALTHIER, MORE POPULAR. YOU'LL ENJOY DANCING. Money back if not satisfied after 10 days' trial. Don't be a wallflower. GET SOME ENJOYMENT OUT OF LIFE! Write for full particulars, without obligation, to

IRVING SCOLNICK, 147 West 42nd St., New York

No JOKE To BE DEAF

—Every deaf person knows that—

Mr. Way made himself hear his watch tick after being deaf for twenty-five years, with his Artificial Ear Drums. He wore them day and night. They stopped his head noises. They are invisible and comfortable, no wires or batteries. Write for TRUE STORY. Also booklet on Deafness.

Artificial Ear Drum

THE WAY COMPANY
741 Hofmann Bldg. Detroit, Michigan

MAN IN EACH TOWN

To Plate Auto Parts, Reflectors, Bathroom Fixtures, Refinish Beds, Mirrors, Chandeliers, by new method; no capital or experience required. Simple plan of manufacturing at home starts you in big money making business. Outfit furnished. Free particulars and proofs.

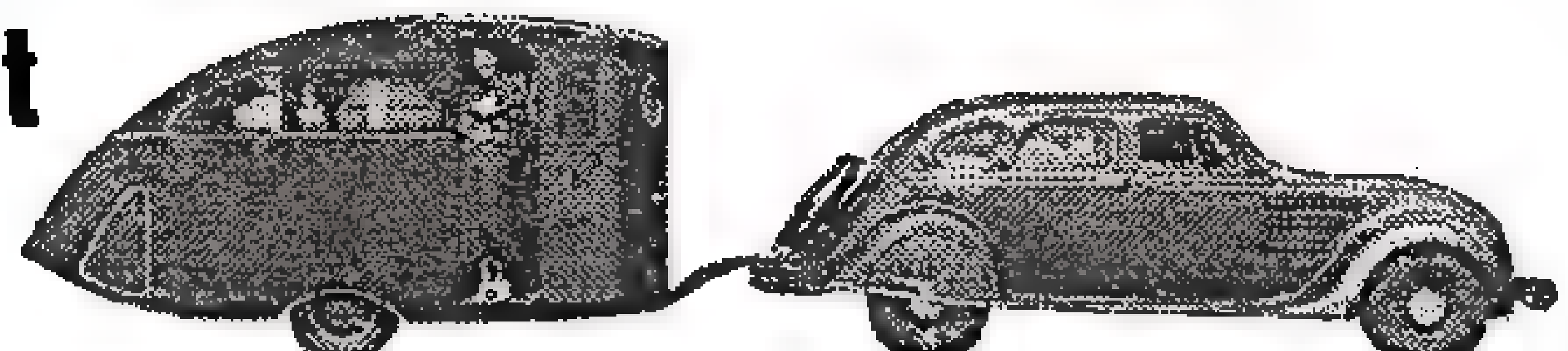
GUNMETAL CO. Ave. P Decatur, Ill.

RAISE RABBITS FOR US

WE PAY YOU UP TO $5.00 EACH. ALSO PUT YOU IN TOUCH WITH MARKETS EVERYWHERE. Large illustrated book and catalog, also copy of the **AMERICAN RABBIT FARMER** and monthly market bulletin showing names of buyers in various parts of America who continuously buy all rabbits offered them. All for 10 cents. Address

OUTDOOR ENTERPRISE CO., 113 Main Street, NEW CITY, N. Y.

Build it NOW



1935 Trailer Plans and Parts Catalogue

Send 9c for big illustrated brochure. NEW ideas, designs, parts, materials. Complete building instructions for above trailer, $1.00. Shop blue prints $4.00. Bridge frame construction, easy to build, sleeps four, ship's galley, shower.

AIRSTREAM TRAILER CO. 134 So. St. Andrews Place Los Angeles, Calif.

BE A RAILWAY TRAFFIC INSPECTOR

RAILWAY and BUS LINES Demand Men with this Special TRAINING

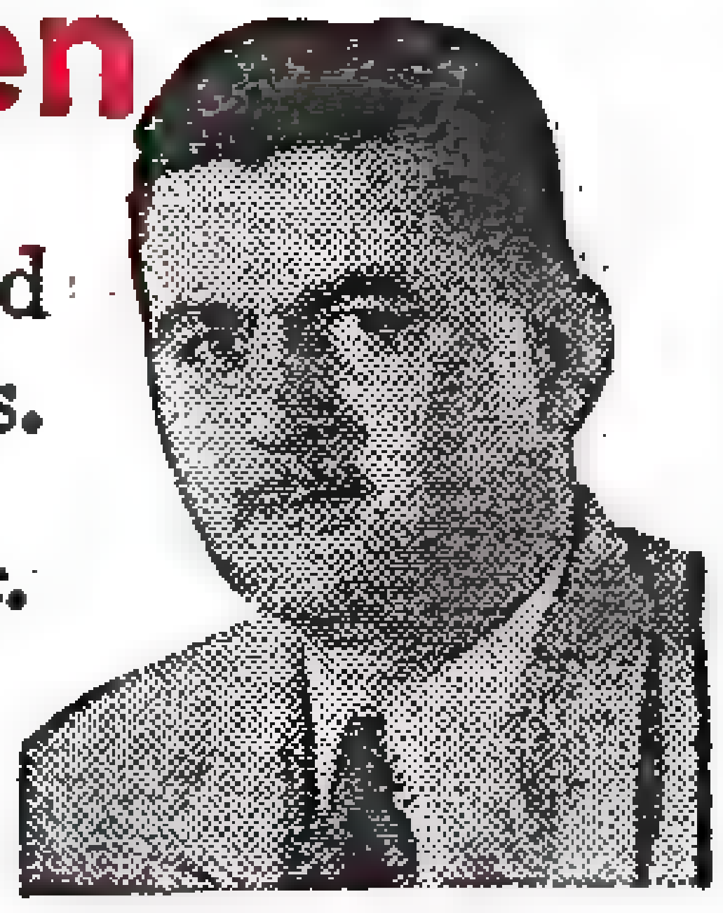
ACTIVE MEN—19 to 50—trained by our short, home-study course as **Railway and Bus Passenger Traffic Inspectors** advance quickly in this fascinating, healthful work. Travel or stay near home. Complete our training and we will place you at up to $140 per month, plus expenses, to start, **or refund tuition.** Experienced men earn more. Costs little; terms. Free Booklet gives 16-yr. record.

STANDARD BUSINESS TRAINING INSTITUTE
Div. 6101 Buffalo, N. Y.

Train for TELEVISION«

Golden Opportunities Await Television-Trained Radio Men

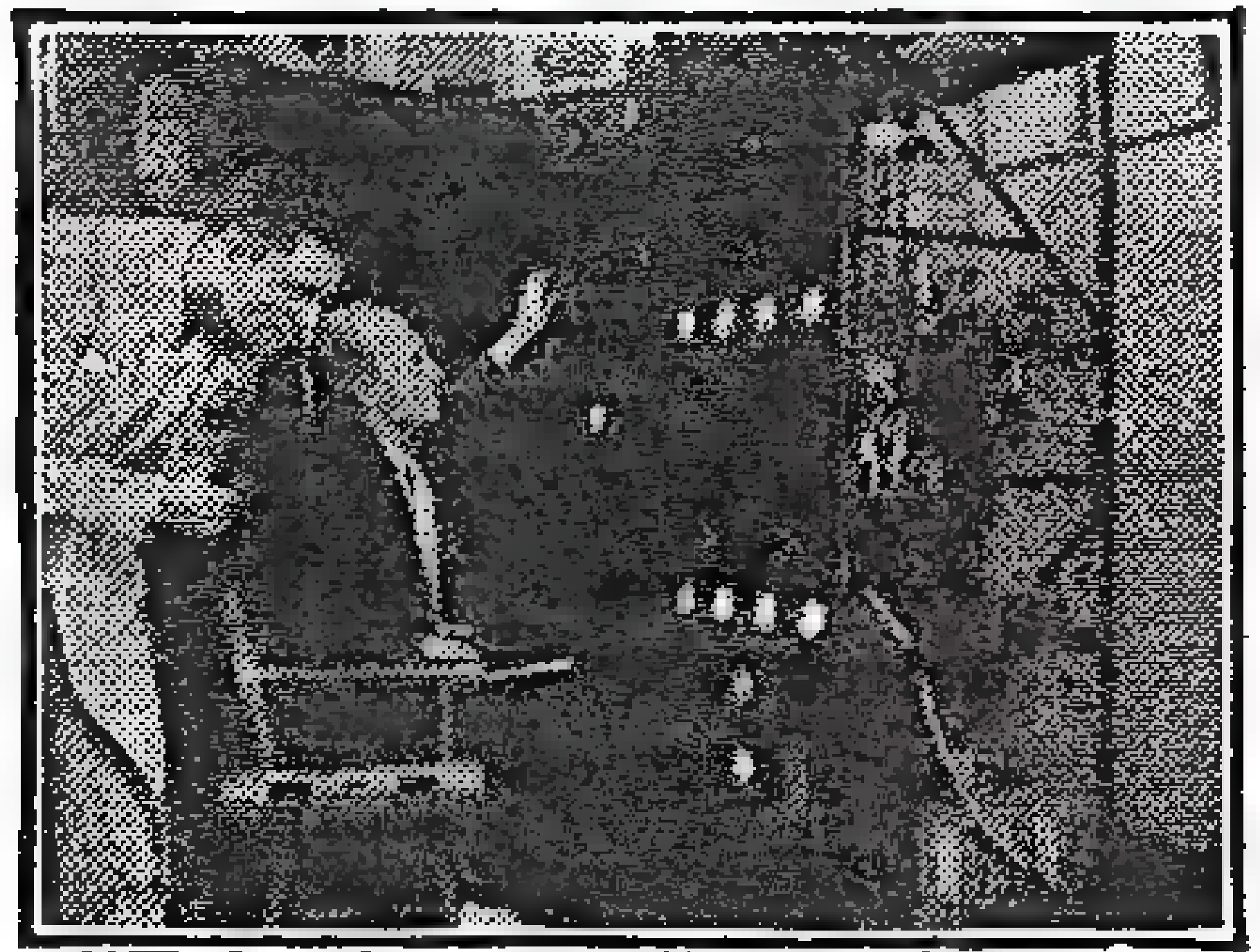
6 Months Genuine Training at my government licensed television broadcasting station W9XAL — 500 watts.



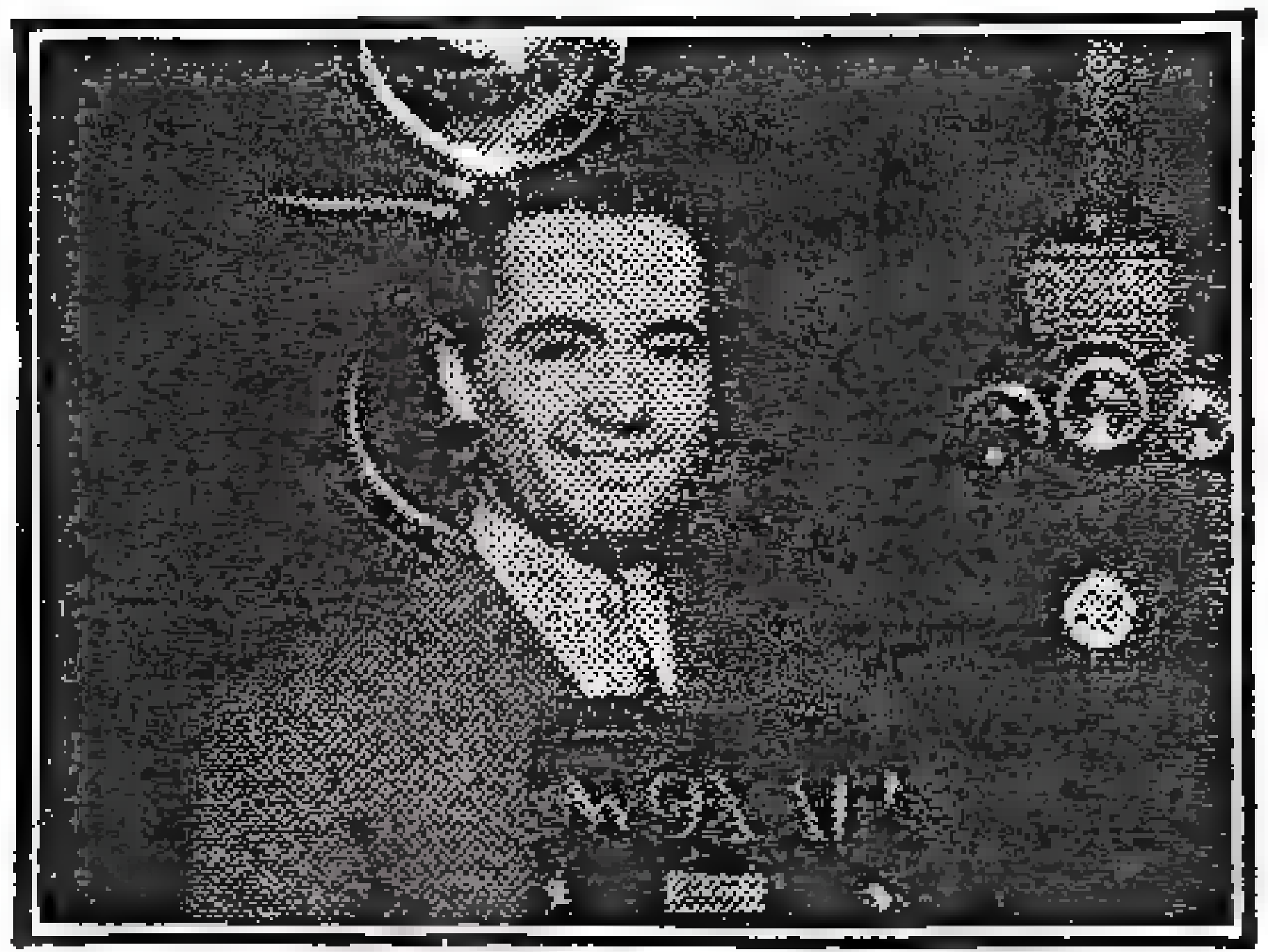
S. Q. Noel, Pres.

Studio scene W9XAL during broadcast of famous movie stars.

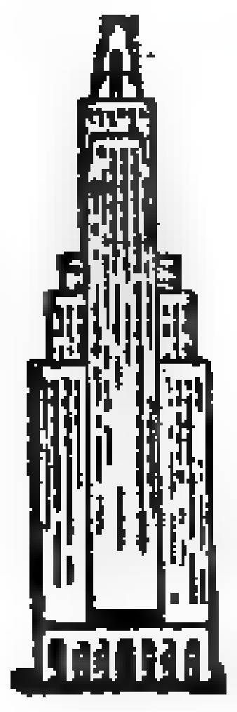
Student engineers qualifying for federal radio operator's licenses.



"Take it away." Student engineers flash actual broadcast on air.



Buddy Rogers — another famous star — broadcasts over W9XAL.



HOME OF W9XAL First National Television, Inc., occupies the four top floors of this beautiful new building. Here are my fine, fully equipped laboratories and modern television studios, with the very latest modern television broadcasting equipment. W9XAL is licensed to broadcast pictures by authority of the Federal Radio Commission (not an amateur station).

$50 ENROLLS YOU

A year to pay balance if desired. Many of my graduates pay for their training after they are through and "on the job" working in excellent positions at famous broadcasting stations.

No Previous Experience Needed

My master course starts you from the first and takes you, step by step, from elementary electricity and radio up to and through the advanced television training. You need no previous radio experience—I will give it to you here in my marvelously equipped laboratories. If you have had radio experience, I will allow you tuition credit for it.

Thorough Radio Training Included

in my master course. Television is an advanced radio science and naturally preliminary course in radio must be of the finest. An average of 87% of my graduates pass their federal exam and receive a radiotelephone operator license (1st class) —the highest broadcast license issued by the government. Sound engineering and aircraft radio also included.

Get Your License and Service Record While Here

My students qualify for their licenses then serve as operators and control room men while television pictures are being broadcast. Your service record will be certified on the back of your license and you go out an experienced man.

Licensed Men Given Preference

these days because the industry wants thoroughly trained men more than ever — and television trained men are being selected for the good jobs. There are no jobs for the half-trained novice. A gov't. license is a passport to a real job with a future.

Free Employment Service

while attending school and after graduation. I will assist you to find part time work to help defray living expense while in school. I will also give you free employment service for life on graduation.

MY GRADS SAY—

Television Expert

★ I am in complete charge of television here and have designed and supervised construction of all television apparatus. M. E. EISENBERG, in charge of Television Development at WDGY (also television station W9XAT), Minneapolis, Minn.

Aircraft Radio

★ This is radio headquarters for TWA and my department does all the service work for the entire Air Transport line. I got the job because I was a trained man — a licensed operator. JACK MURRAY, Transcontinental and Western Air, Inc., Municipal Airport, Kansas City, Mo.

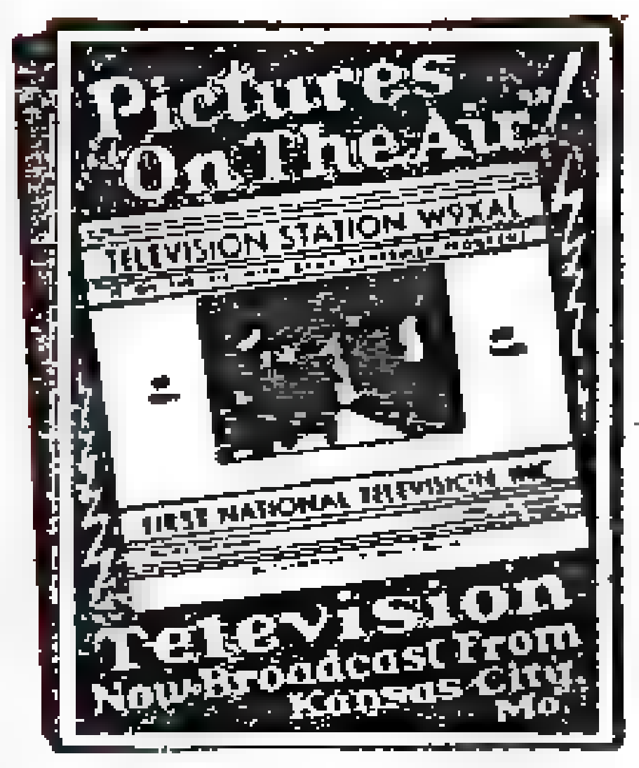
Broadcast Station Operator

★ Many thanks for securing this job for me. Your laboratory work is very practical . . . a very helpful part of the course is the actual experience at W9XAL . . . and "riding gain" on sound programs. CLARK B. SMITH, Radiotelephone operator (1st class), license number 17-503. Radio Station WLBF.

OTHER JOBS FOR FIRST NATIONAL GRADS

Other jobs leading to $50 a week and up: Television Research Technician; Television Installation Engineer; Television Consulting Engineer; Radio Engineer; Operator Broadcast Station; Aircraft Radio Engineer; Service man on sound picture equipment; Service man on Public Address systems; Radio set service man; Sales Engineer; Maintenance Engineer; and many others.

MAIL COUPON FOR FREE BOOK ABOUT TELEVISION


Pictures On The Air
TELEVISION STATION W9XAL
FIRST NATIONAL TELEVISION INC
Television Now Broadcast From Kansas City Mo.

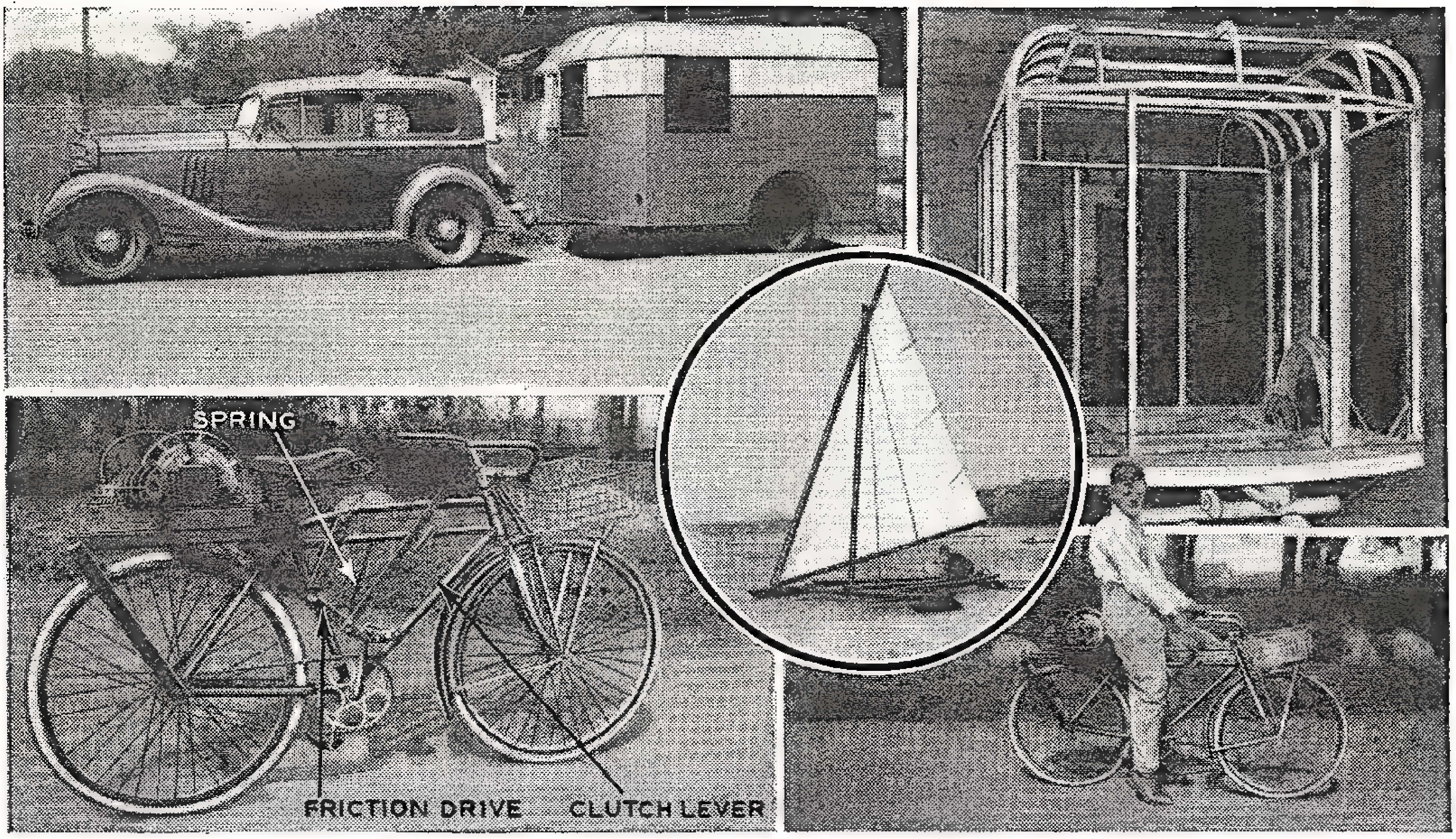
S. Q. Noel, President Training Division
FIRST NATIONAL TELEVISION INC., Dept. GG-1
Power & Light Bldg., Kansas City, Mo.

Dear Mr. Noel:
Send me your free book about television without further obligation to me.

Name ....

Address ....

Random Chips from



PRIZE WINNERS Mark Chapman built the trailer in two upper photos from MM's Wanderer plans and won first prize of $5.00 this month. Photo of ice boat in circle brought second prize, $3.00, to Ed Shealy. Carl Rasmuson made the motorized bike with a washing machine motor and won third prize, $2.00.

WHEN you have a spare dollar or so, do you go down to the second hand shop, select an old piece of furniture, and then take it home to rebuild it into something so unusual that every visitor praises it?

Or do you get some lumber, seclude yourself for hours or days in your workshop and come out finally with neatly finished furniture of your own design?

If you enjoy doing these things, you will find a big contest offering 14 prizes totaling $125 in cash just suited for you in this issue. Turn to page 44.

The contest is the second in a series of four offering $500 in cash prizes to MM readers. If you missed the first contest in the December, 1934, issue send 15 cents for a copy to Modern Mechanix Publishing Co., 529 S. Seventh St., Minneapolis, Minn.

* * *

A reader turns to MM for help to find someone with a seaplane who would be willing to go into partnership on a venture seeking a fortune in gold in Canadian wilds. Here's his story:

56 St. Clair Ave., W. Apt. 5.
Toronto, Ont.

Dear Editor:

'Tis with despair that I turn to ye! There seems to be no one owning seaplanes around here with gambling spirit or gumption enough to go off on a prospecting venture up to the Long Sac area in northern Ontario, now a booming gold area.

What I am after is a partner with a seaplane. I have had some very valuable experience in the field as well as my studies and laboratory work in mining engineering at school.

It will not be necessary to fly with heavy loads as a base camp may be erected twenty miles from the transcontinental railway and most of the stuff may be sent via rail.

I would like to state that I have the complete outfit necessary for a successful prospecting venture for two. I would also like to say that I have been successful in staking and selling gold claims in the vicinity of Sudbury.

Harry C. Easton.

If you want adventure and have a seaplane, get in touch with Easton. And when you make your gold strike, save a little nugget for a camera and take a photo of your outfit for the Editor's Workbench.

* * *

While space permits, we'll give you the winning letters and photos in this month's

the Editor's Workbench

Want to go prospecting for gold in Canadian wilds? An MM reader is seeking a partner with a seaplane. And here's another contest in $500 cash prize series.

Workbench contest. First prize of $5.00 goes to M. H. Chapman for the photos of his automobile trailer. His letter says:

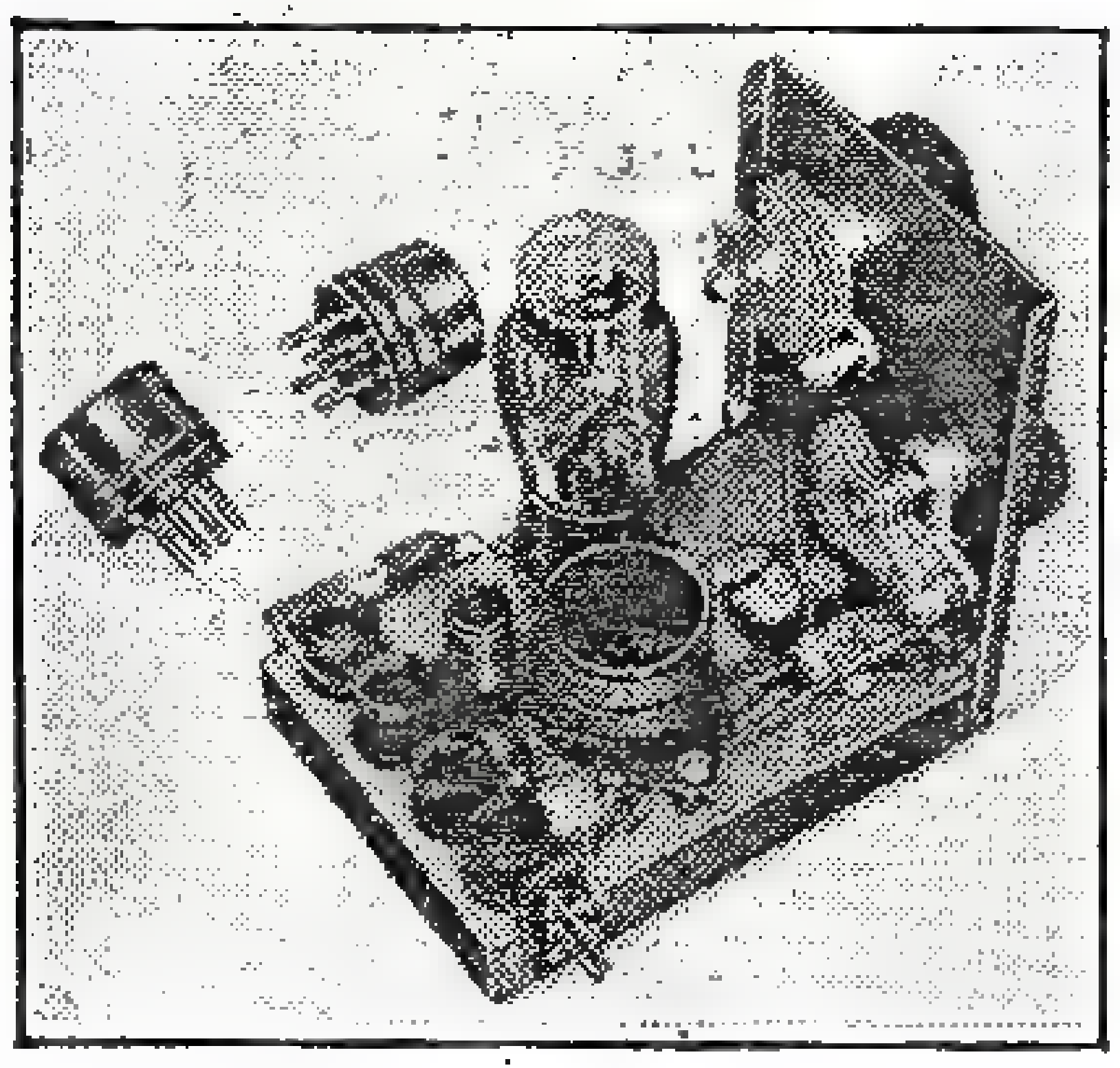
Baldwinsville, N. Y.

Dear Editor:

Enclosed are snapshots of the trailer I built and used this summer. I used for my model the "Wanderer" published in the December, 1933, issue of Modern Mechanix and Inventions.

It is built on a Chev. 1929 front axle. It has sides of 1/4" masonite, top of canvas painted aluminum, and is nine feet three inches long, six feet wide and six feet high. Not having access to a welding outfit I used oak throughout. The windows are street car windows purchased from an abandoned line. I used the tire of an old lumber wagon wheel for the wheel housing. The trailer weighs 1460 lbs. with all the equipment. It can sleep four persons and has traveled over the highway better than 50 miles per hour.

M. H. Chapman.



This is the one-tube short wave model described in the October, 1934, MM. G. D. Aydlett, of Norfolk, Virginia, built it.

If you want to build as useful a trailer, for 50 cents you can get a copy of the 1935 edition of the Handy Man's Home Manual which includes drawings and all instructions for "Wanderer." Enlarged blueprints can be obtained for $1.00. Send your orders to MM.

* * *

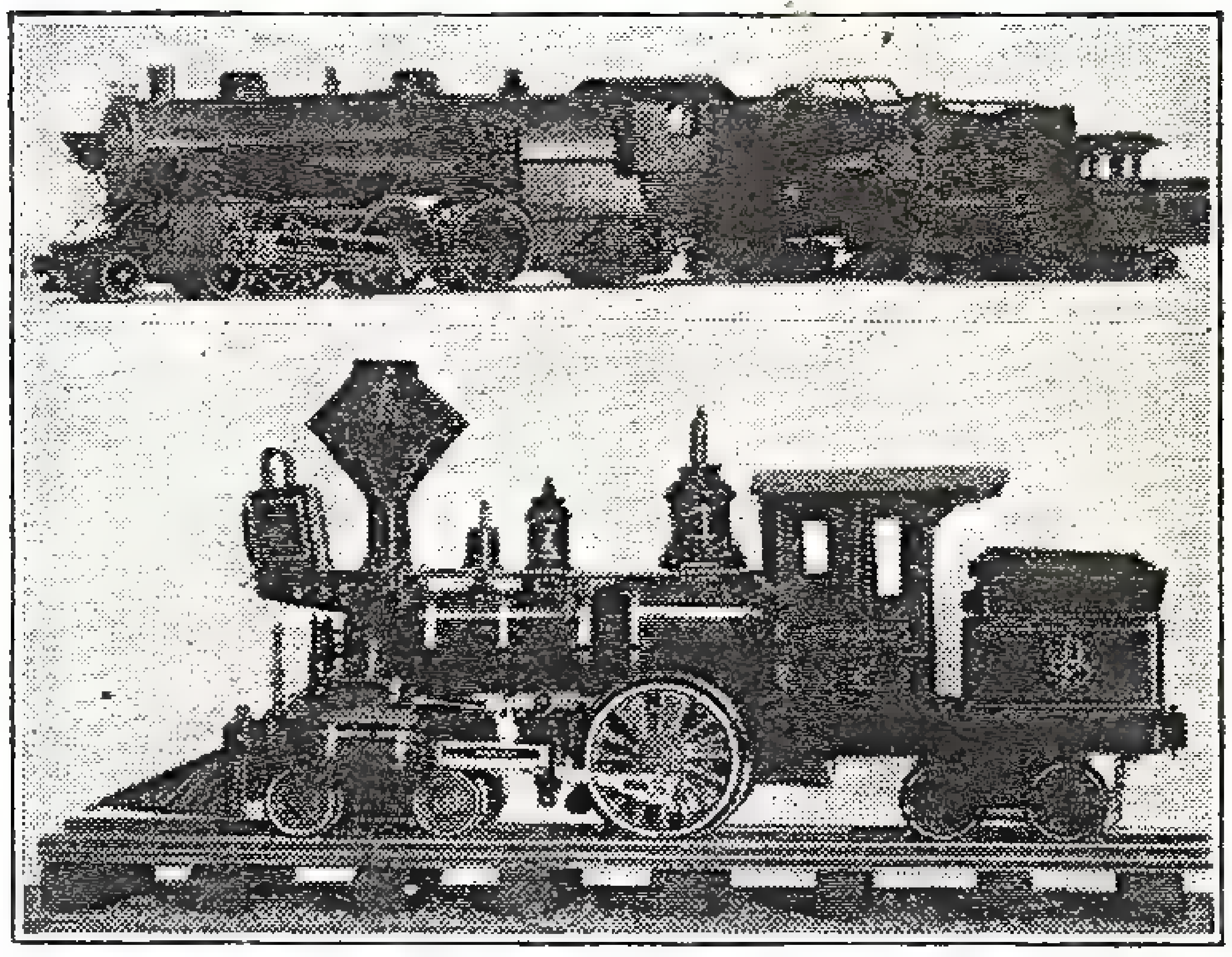
Second prize of $3.00 was awarded to Edward M. Shealy. This is what he says about the ice boat shown in the photo:

Madison, Wis.

Dear Editor:

Enclosed find picture of my ice boat which I built in my spare time in 9 days last winter. It was easy to build and the total cost including the sail was only $14.50. She carries 150 feet of sail and is lateen rigged. The sail is an equilateral triangle 18' on each side and is suspended from a mast by means of a hook. The boat does 50 to 60 m.p.h.

Edward M. Shealy.



Two fine locomotive models built by U. B. Graff. Top photo shows Pacific type and lower first Southern Pacific locomotive. Both are built to scale one-fourth inch to the foot.

* * *

Carl Rasmuson wanted a motorized bicycle and solved the problem easily and at low cost. His photos and letter brought him third prize of $2.00. After assuring us that MM "is the best mag. on the market," he says:

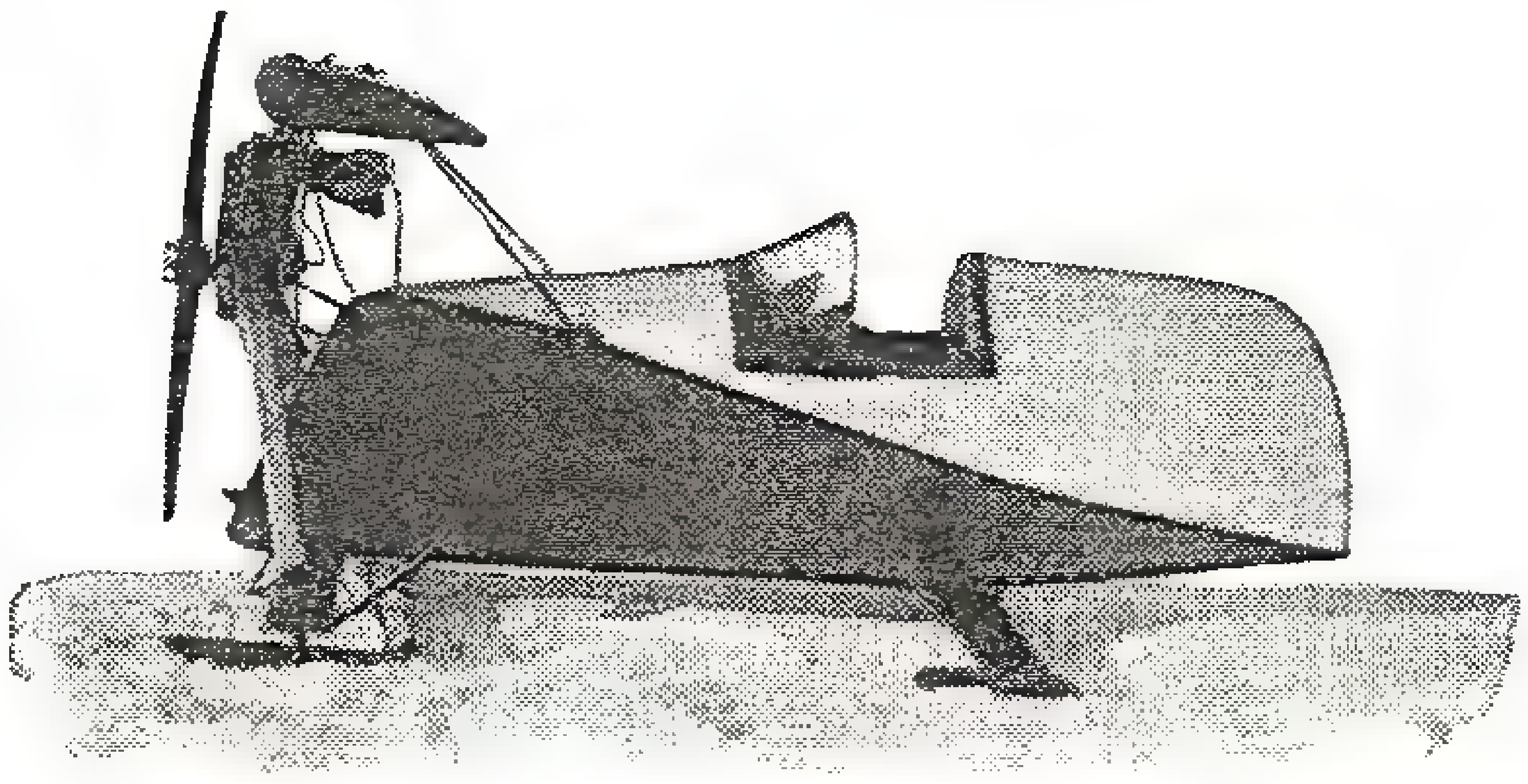
Rockwell City, Ia.

Dear Editor:

I am enclosing two snapshots of a Maytag motor arrangement for a bike. It has friction drive on the rear tire through an old Maxwell fan pulley and a piston for an extended belt pulley. The clutch is held in with a spring. It is started by merely releasing the clutch lever when a little speed is obtained with the pedals. At first the speed was slow but I increased the size of the motor pulley and then got about 18 m.p.h. If anyone is interested I can send details.

Carl Rasmuson.

(Continued on page 20)



This ice sled, built by John Ceraska, can do 75 m.p.h. on ice. It has a home-made prop and a motorcycle engine.

PROBAK JUNIOR BLADES
NRA
PROBAK JUNIOR
T.M. REG.
MADE
OTHER

NEVER

BEFORE SUCH A SMOOTH SHAVING BLADE

at this low price!

NOW! PROBAK JUNIOR 25 blades for 59c

Also Trial Package of 4 Blades For 10c At Your Dealer

"GENTLEMEN:

"During the past few years I've been driven because of necessity into the lower-priced razor blades—my beard suffering because of the shortcomings of my pocket-book. Your Probak Jr. has brought back shaving comfort at no extra cost.

"Sincerely yours,
E. Eugene Leonhart,
San Jose, Calif."

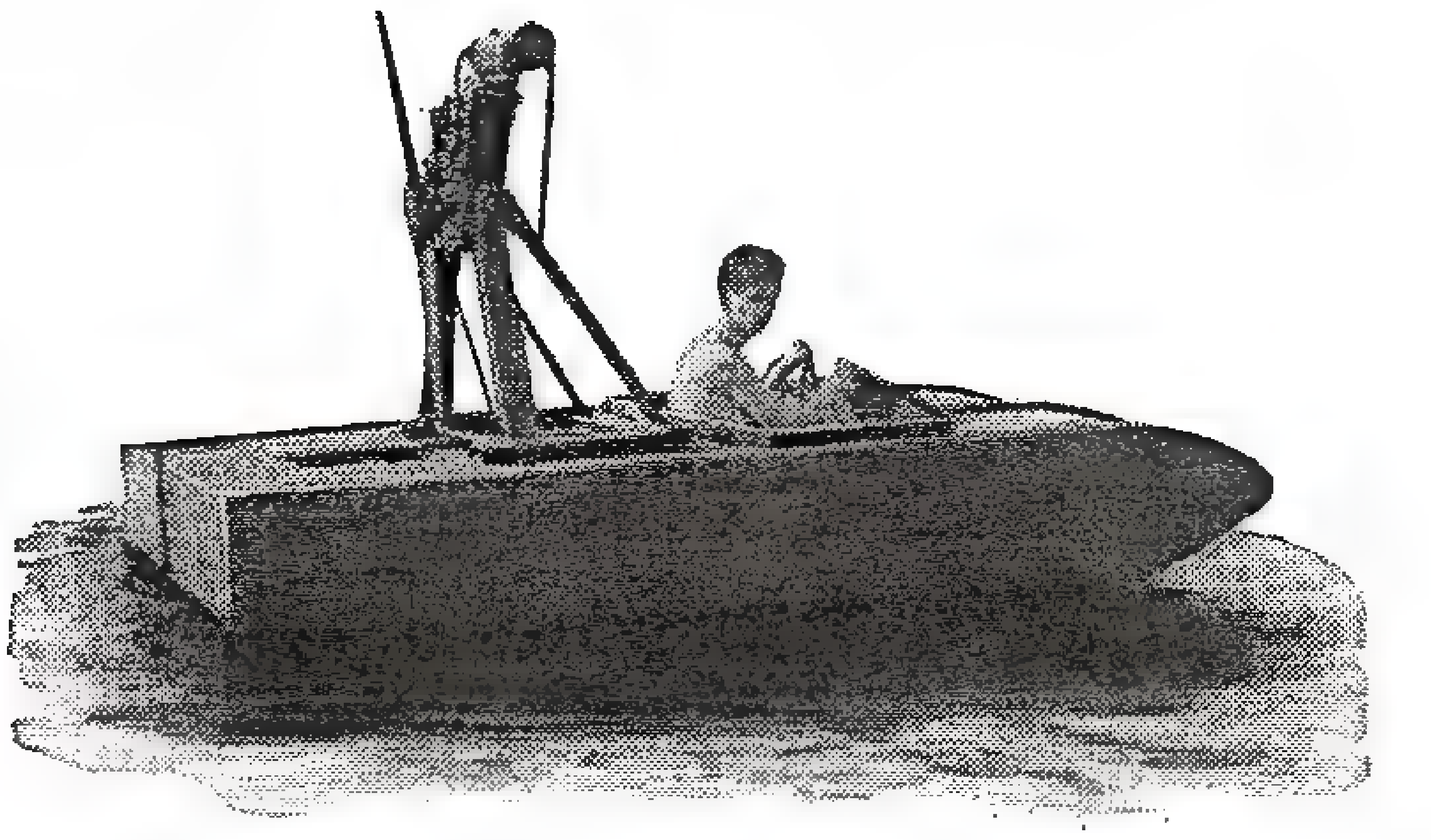
Unsolicited letters like this prove the amazing quality of Probak Jr. Try this remarkable blade—uniformly keen and smooth-shaving. Get Probak Jr. from your nearest dealer's—a remarkable value at 25 blades for only 59¢ or a special trial package of 4 for 10¢.

Probak Junior fits all Gillette and Probak razors

Chips From the Editor's Workbench

(Continued from page 19)

Notice how parts of Rasmuson's motor bike are identified on the photo by "lettering." Here's how to do the same with your pictures for the Workbench contests when the photos have details that should be pointed out. Put tissue or transparent paper over the photo, either clipping it or pasting it to the back of the print. Draw arrows on the tissue to the parts to be identified and name the parts. Use a soft lead pencil and do not press on the glossy print. An artist takes care of the lettering when the picture is published.



Gordon Lyons built this hydroglider. It is powered with a twin cylinder motorcycle engine. It travels fifteen m. p. h.

Model railroading is one of the most fascinating hobbies for the workshop fan. Model railways are not considered toys but are exact replicas of equipment used on full sized railroads. This month on page 110 we tell you how to build an 00 gauge passenger coach. Plans and instructions for building a locomotive to go with it can be obtained from MM for 50 cents. The wheel gauge of the locomotive will have to be altered slightly, however, as it was intended for the English system. Here is a letter from an experienced model railroader:

San Francisco, Calif.

Dear Editor:

I am sending you two photographs. The "old timer" is a model of the "Collins P. Huntington," the first locomotive of the Southern Pacific railway. This locomotive saw service as an express passenger engine. The second photo shows the "C. P." standing alongside of its modern counterpart, a model of a light Pacific Type express engine. Both are quarter scale 0 gauge, that is ¼" equals 1'.

U. B. Graff.

If you are a model railroad builder, send a photo of your models to the Editor's Workbench. If you want more articles on building model railways, drop the editor a card.

* * *

John Ceraska sent us the picture of the ice sled. Here are the details:

58 E. Mountain St.
Worcester, Mass.

Dear Editor:

I am sending you a picture of an ice sled I built. It is capable of doing 75 m.p.h. on ice

(Continued on page 22)

BUILD YOUR OWN RADIO

FREE CATALOG

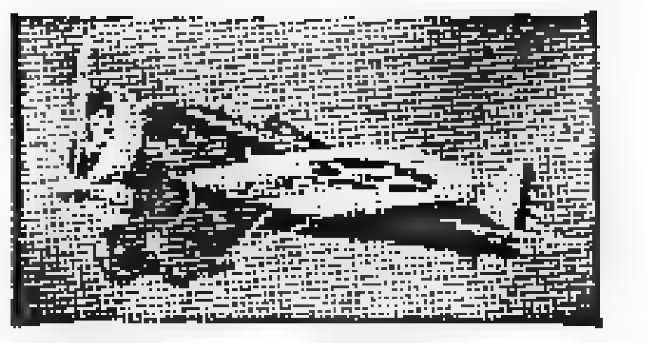
Send for ALLIED'S Big New 1935 Catalog, featuring Kits and Parts for building the new Short Wave and World-Wide Radio Receivers. We supply FREE parts lists for building any radio described in any magazine. Our prices are lower. Write for our FREE Catalog. Address Dept. B, 833 W. Jackson Blvd.

1934
RADIO
Allied Radio

Allied Radio
CORPORATION
833 W. JACKSON BLVD., CHICAGO, ILL.

IDEAL SUPER-DETAIL FLYING PLANES
MOVABLE CONTROLS OPERATED FROM COCKPIT
DESIGNED FOR YOU BY FLYING MEN

You'd like an experienced flyer to help you lay out a plane with controls that work elevator, rudder and ailerons from the cockpit. That's what IDEAL does! Experienced flyers who have spent their lives designing and flying planes have laid out these big, beautiful flying models. **That's why you learn aviation principles building planes the IDEAL way.** That's why IDEAL planes are absolutely accurate 100 per cent scale models—perfect, complete in every detail. Also includes bright, high lustre finish and many other exclusive Super-Detail fittings.



Boeing P-26A
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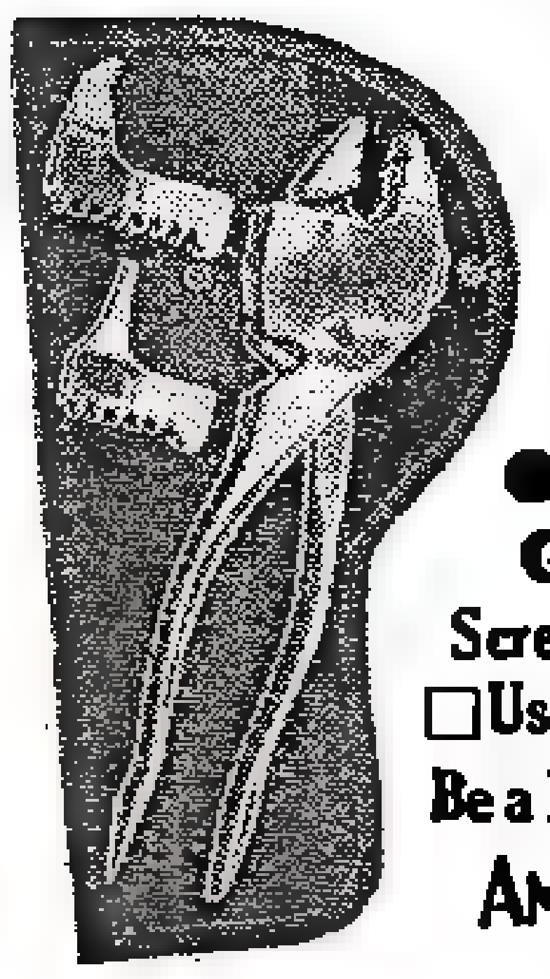

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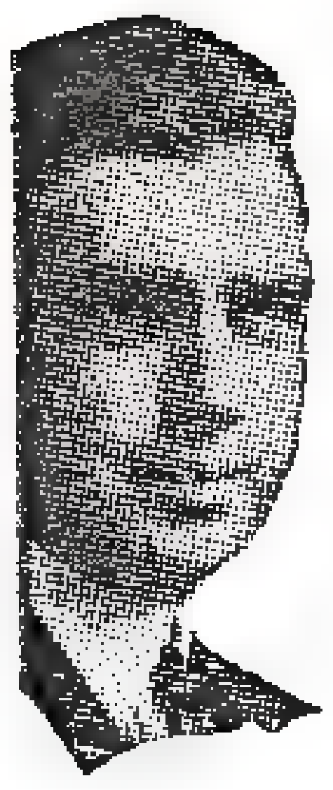

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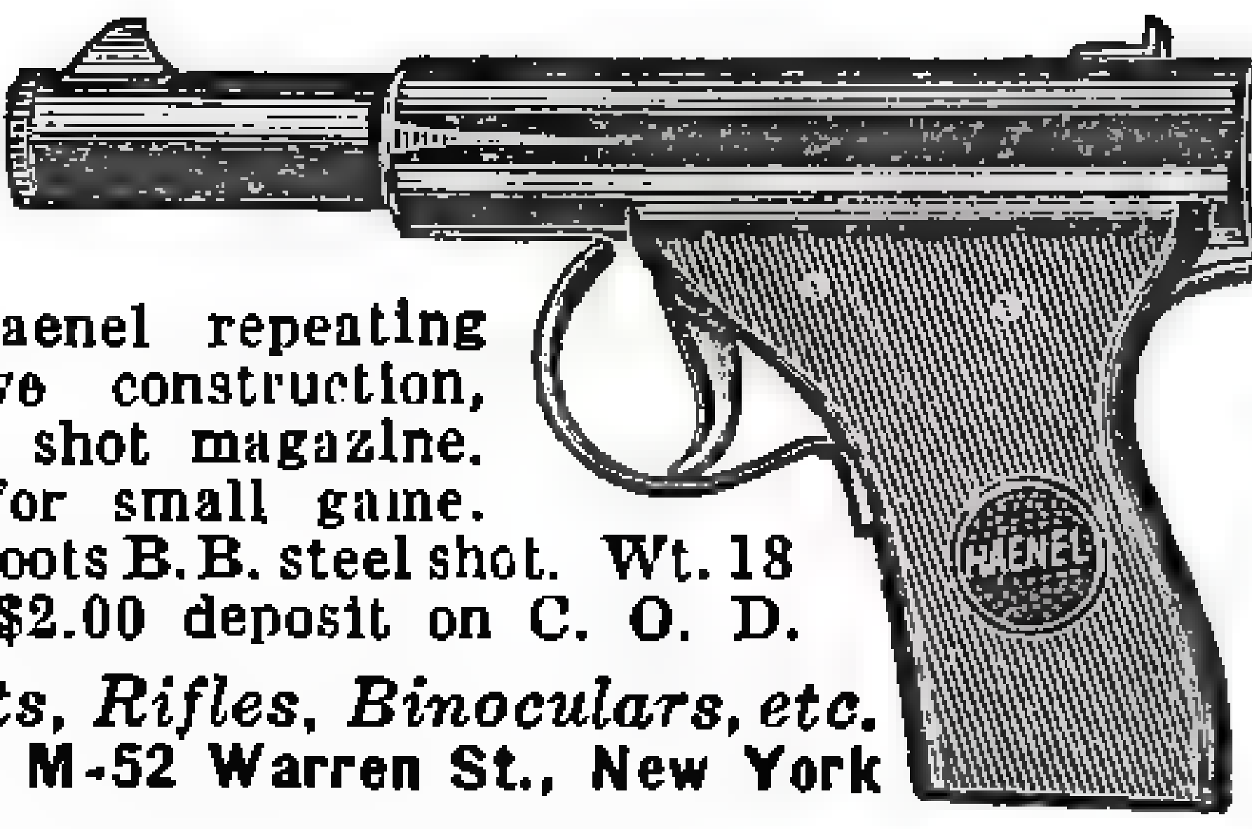

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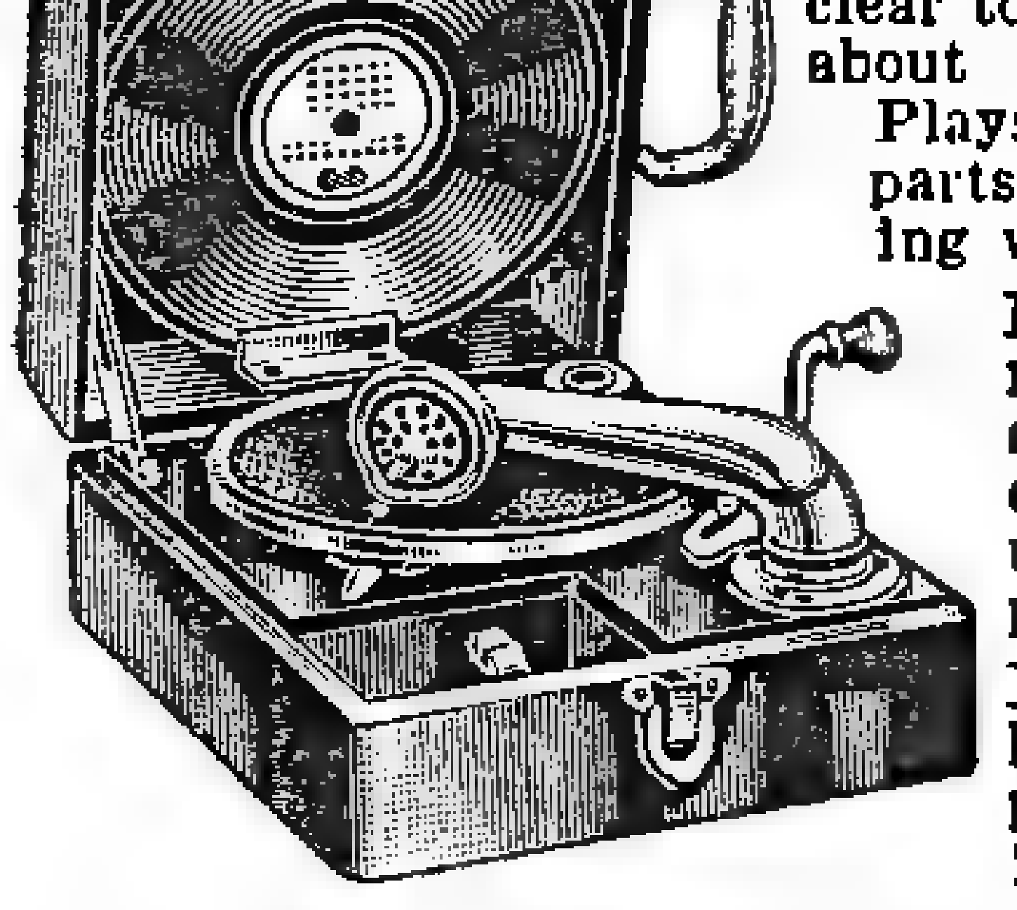

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Chips From the Editor's Workbench

(Continued from page 20)

and about 40 m.p.h. on hard snow. Power is furnished by a Harley Davidson 61 motor that turns a home-made prop of 4½ feet diameter and 3½-foot pitch 3150 r.p.m. The body is built of spruce and plywood covered with airplane fabric and doped. All inquiries will be answered.

John Ceraska.

* * *

Gordon Lyons built the hydroglider shown in the photo, but was disappointed with its speed. He says:

St. Gabriel, Que.

Dear Editor:

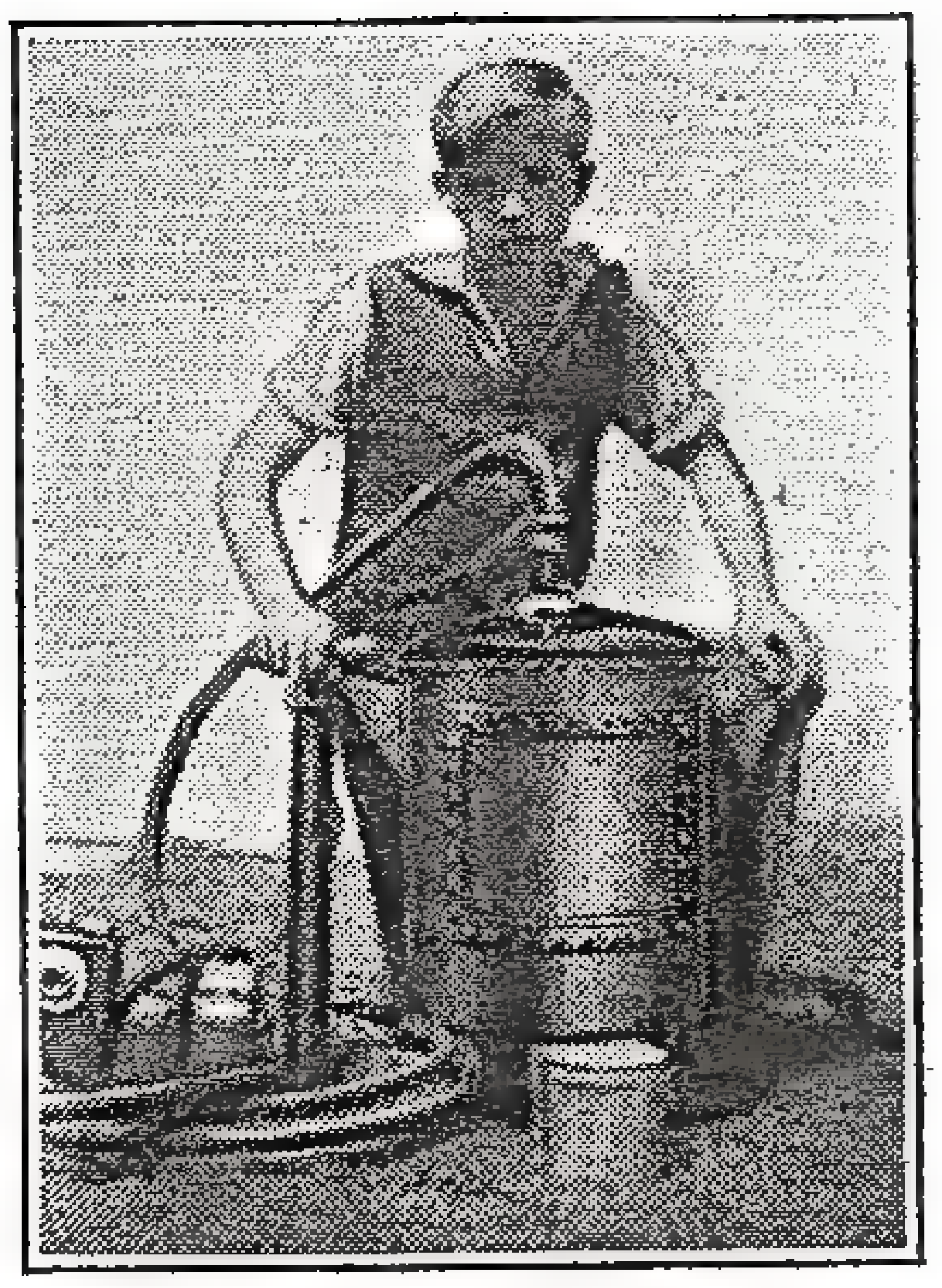
The hydroglider is powered with a twin cylinder motorcycle engine. This boat is only capable of 15 miles per hour. I would like to know the reasons for such slow speed.

Gordon Lyons.

We believe that Lyons is getting good speed with his motor. To increase the speed he will need a more powerful motor.

* * *

Diving helmets are as popular and successful as ever. Dick Day, of Vancouver, B. C., Harry Throsel, Waukegan, Ill., and Ed Viner, Little Falls, Minn., each have built one and are having great fun exploring underwater in the lakes and rivers near their homes. They sent us photos and letters, but we have room only for Day's this month.



Here's Dick Day and his telephone-equipped diving helmet.

Vancouver, B. C.

Dear Editor:

I am sending a picture of a diving helmet which I made out of a hot water boiler. I cut the top off the boiler with a cold chisel. I then had semicircles cut out on each side with an acetylene torch so that the helmet would rest on my shoulders.

I cut the window out and covered it with celluloid, using nuts and bolts to clamp the gasket and the celluloid to the helmet. Cans were riveted to both sides of the helmet, each being made to hold a fifteen pound weight to carry the "diver" to the bottom. There is a small hole at the bottom of the helmet to let the bad air out.

I installed a telephone in the helmet using a pair of earphones and the talking piece of a telephone. Above water I have a small school telephone, the current used being supplied by two 1½-volt dry cells. The wires from the phones are carried up through the air line.

I have gone down successfully 30 feet and am planning to go down after a sunken speed boat.

Dick Day.

(Continued on page 24)

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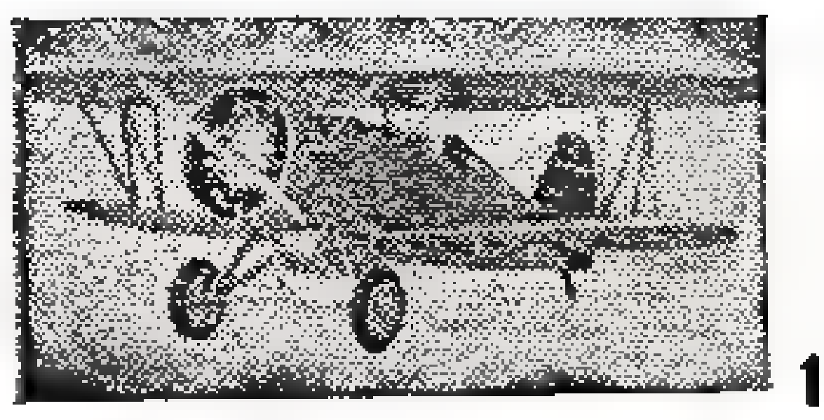

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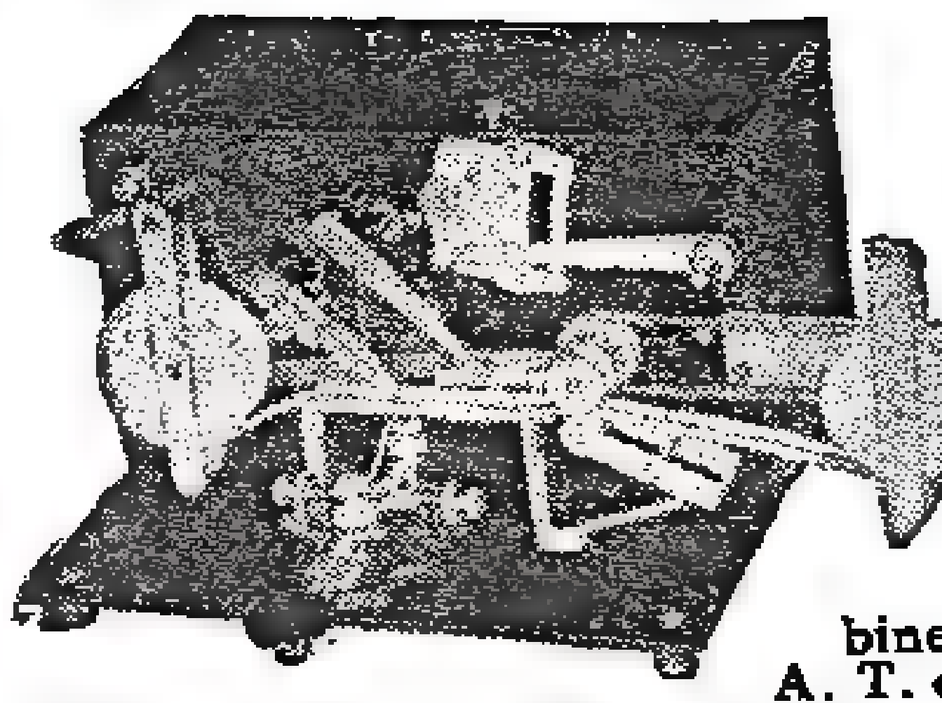

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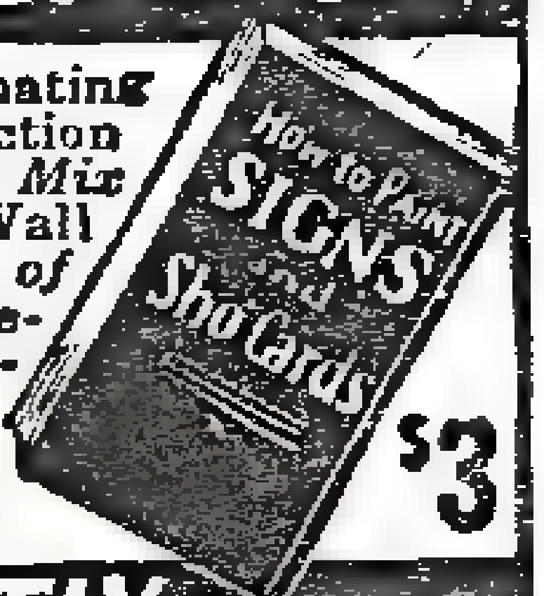
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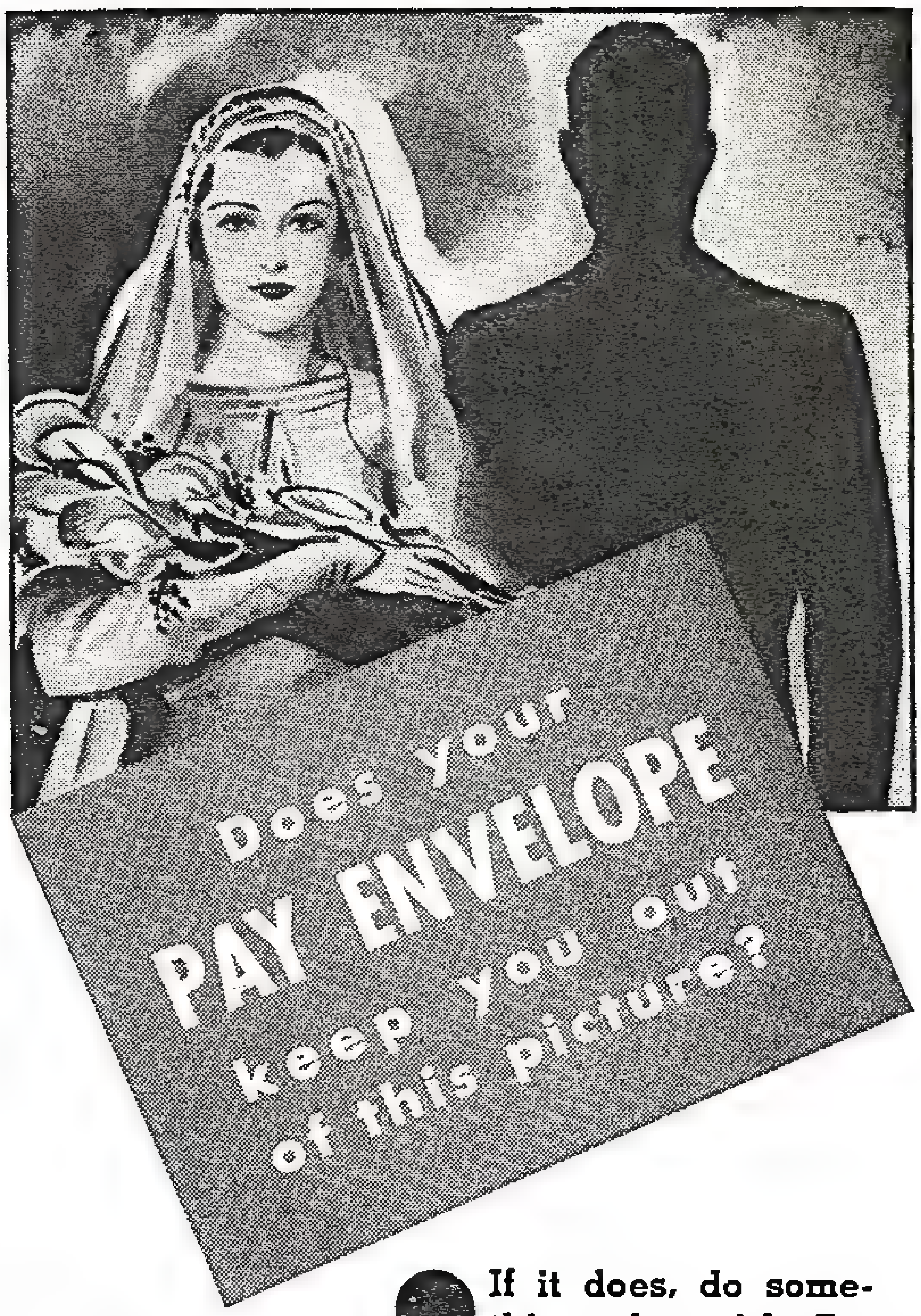

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Chips From Editor's Workbench

(Continued from page 22)

This is Walt Schaefer and his latest glider. It has a 36-foot wing span, weighs 285 lbs., and cost him $60 to build.

Here's luck, Dick, on that speedboat hunt. Throsel tells us he built his helmet for less than two dollars. Ed Viner also has a telephone installed in his underwater outfit and is planning to put a searchlight on it. He wears a belt loaded with 25 pounds of lead to hold him down. Plans for a good diving helmet can be obtained from MM for 75 cents.

* * *

The newest club to receive a charter in the International Society of Modern Mechanix and Inventors is the Y's Craftsmen located in the capital of the United States, Washington, D. C. The club members are interested in leathercraft, cabinet making, and inlay work. John W. Sumner is president and Mrs. Marguerite Bone is secretary. We welcome Mrs. Bone as the first woman to be an official member of the Society.

* * *

Here's a light plane fan who wants to hear from his brothers of the air:

> **308 Locust Street Clearfield, Pa.**
>
> **Dear Editor:**
>
> **Hello fellows, it's me (I) again crashing the column this time with my newest secondary glider. It's a pip and I wish you could see her fly. It has a wing span of 36 feet, 5 foot chord, and 80 inch landing gear. She weighs 285 pounds loaded. I built it in four month at a cost of about $60.**
>
> **I flew it, and am flying it with the best of luck, never a crack up. She takes off at 15 m.p.h. with a car towing and climbs fast.**
>
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>
> **Walter Schaefer.**

* * *

E. G. Stafford, of 65 A Durrington Road, Clapton, E 5, London, England, would also like to correspond with MM readers. He is 30 years old and is interested in anything mechanical, sports, psychology, general management and chemistry. He would especially like to hear from members of the International Society of Modern Mechanix and Inventors.

(Continued on page 26)

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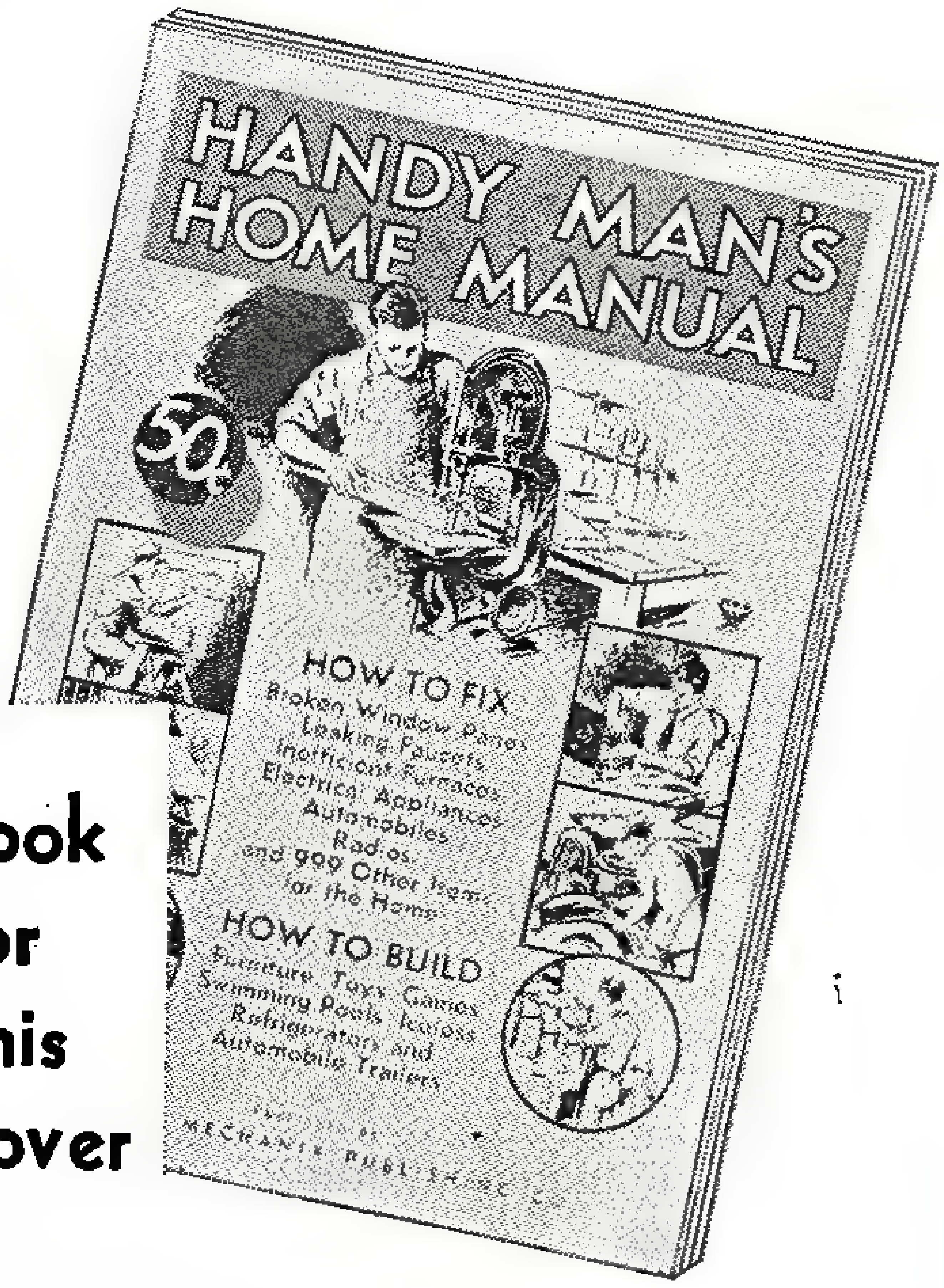
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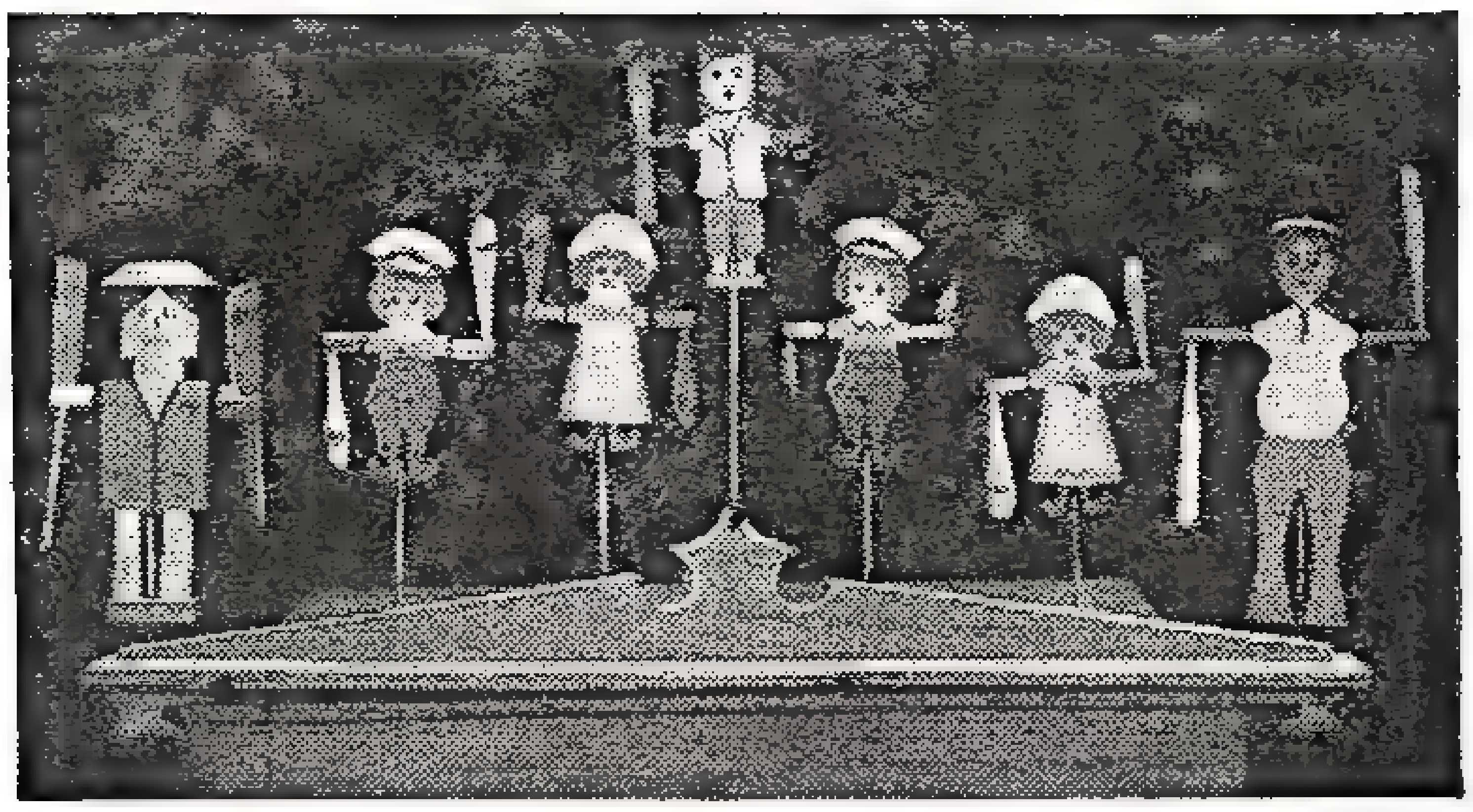
Chips From the Editor's Workbench

(Continued from page 24)



George Raymond makes a business of building novelty windmills such as these in his shop, the "Cape Cod Windmills."

* * *

George Raymond, of Kingston, Mass., has developed a thriving business building unusual windmill novelties in his workshop. His shop is known as the "Cape Cod Windmills." A group photo showing some of his original designs appears above.

* * *

What do you like best about MM? We'd like to know. This is what appeals to Henry Cook of Scapa, Alberta:

> **"I like to make things, most anything that is useful, and your magazine has more practical stuff in it than the others. Other magazines seem to take it for granted that their readers are fully equipped with a machine shop complete with lathe, etc. Suffice to say that as long as your magazine continues on the practical side I'm for it."**

* * *

The Workbench got a bit more space this month. We hope we can keep it up. Let's see your pictures and letters for our contests. By the way, what light plane fan will send us the first photo showing himself in the air in his ship? You know what we mean—one of those closeups made with an automatic shutter arrangement on the camera. That's all until next month.

NOVEMBER PROBLEMS CONTEST WINNERS

IN THE November Problems Contest, the total area over which the horse could graze amounted to 30,294.2 square feet. Many carried this solution out to a dozen decimal places despite the fact that they had used only four or five decimal places in previous calculations. Quotient and remainder for the cryptic division are 120996 and 384 respectively. In the monkey problem, 15 was the least number of nuts that could be gathered, with one man getting eight, the other 4, and the monkey 3.

First prize of $10 goes to J. L. Mims, Maryville, Tennessee; 2nd prize of $5 to Christy A. Wiken, Rockford, Illinois; and four third prizes of $2.50 each to Robert Fong, San Francisco, California, Raymond Mathewson, New Britain, Connecticut, Edward D. Howell, Detroit, Michigan, and Wm. Zimmelman, Detroit, Michigan.

The announcement of this month's prize contest appears on page 44.

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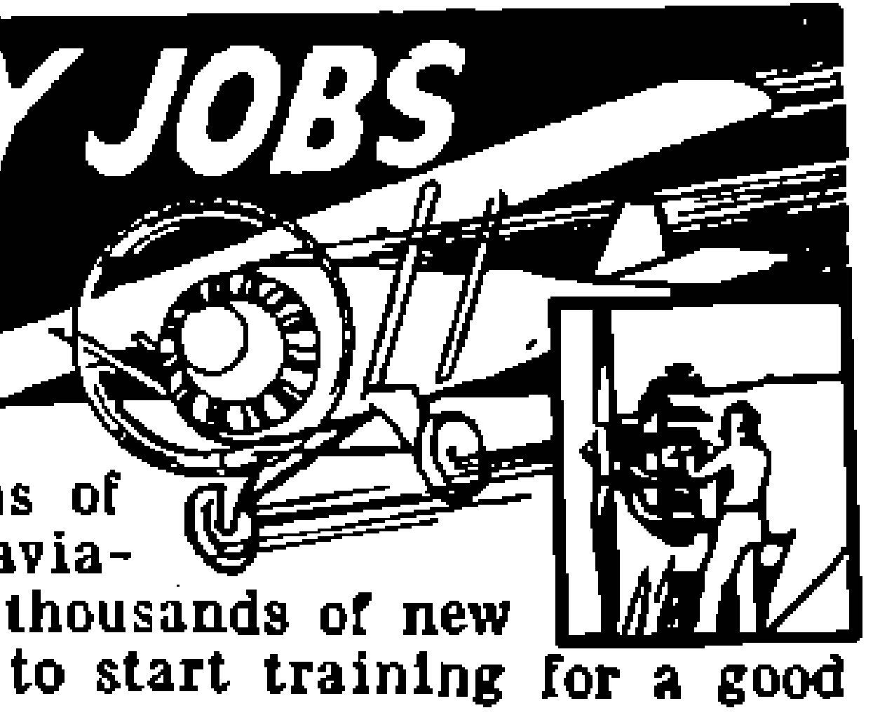

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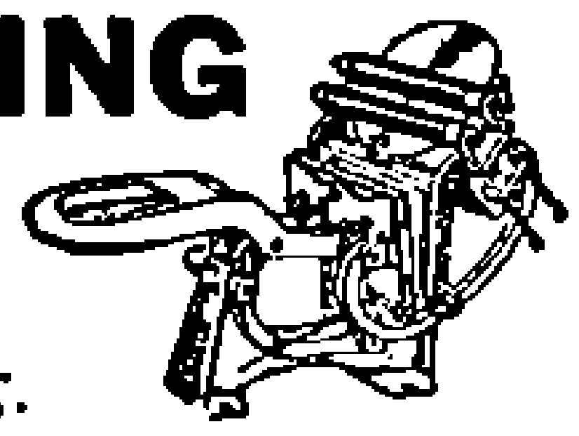

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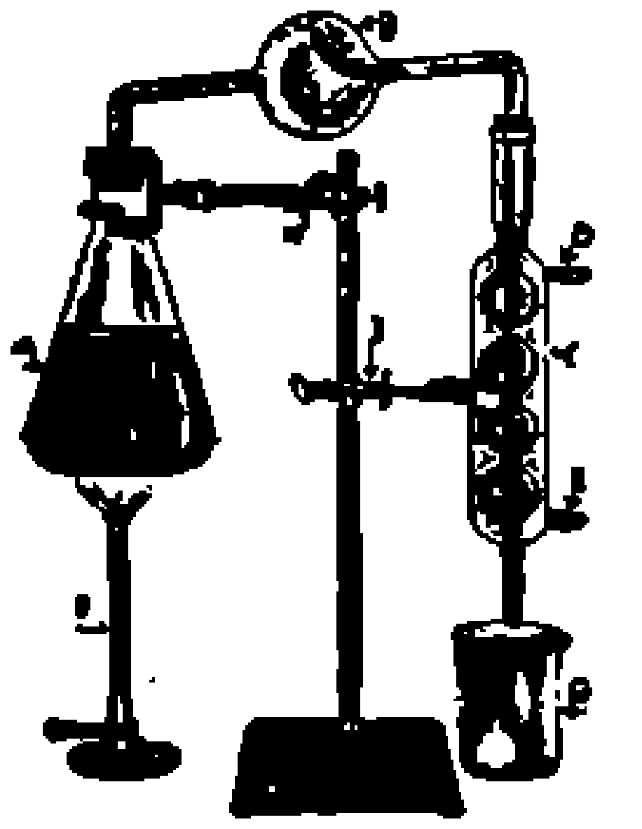

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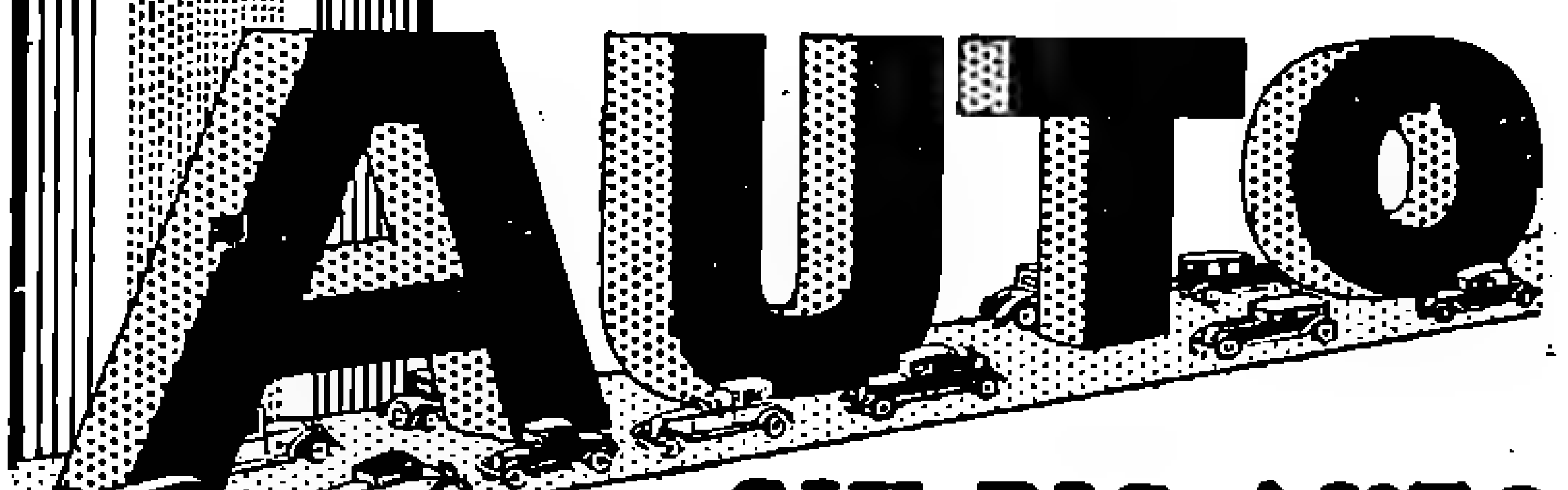

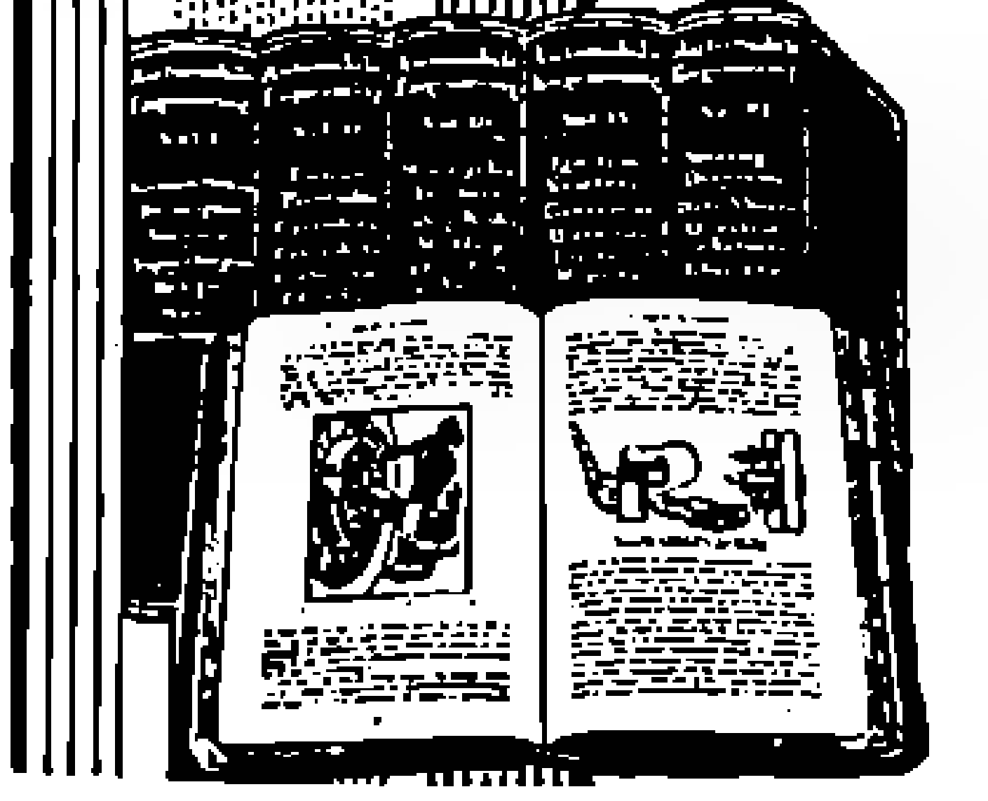

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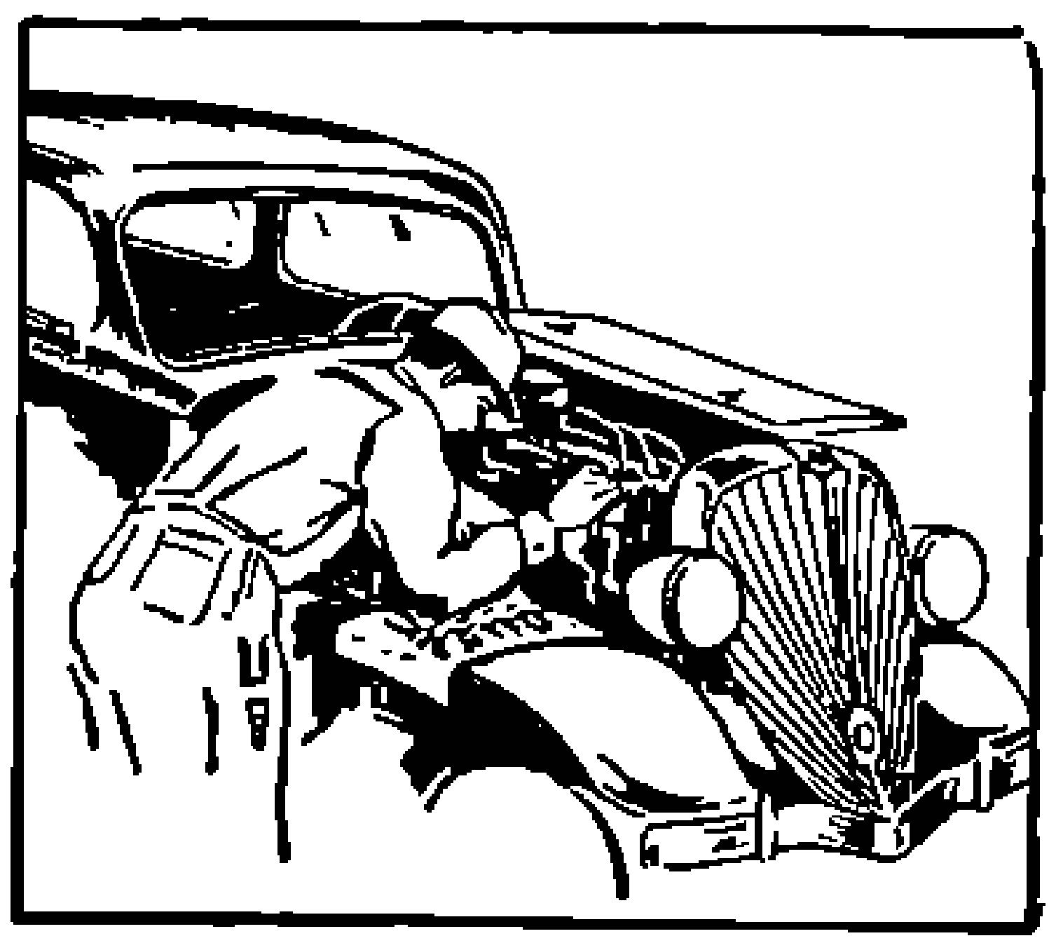

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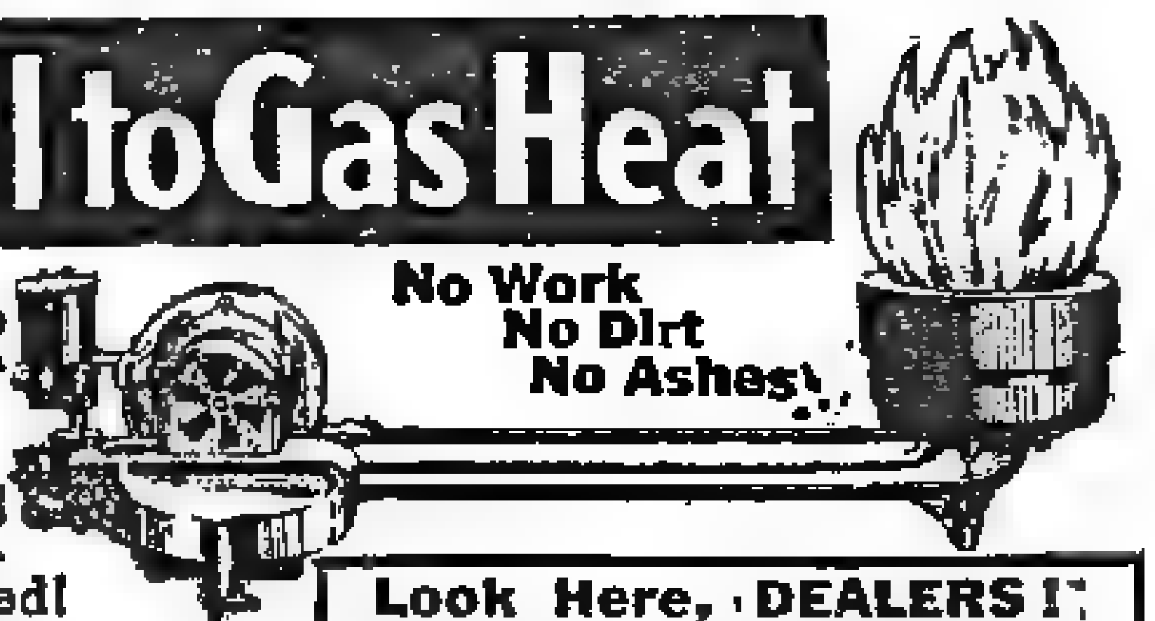

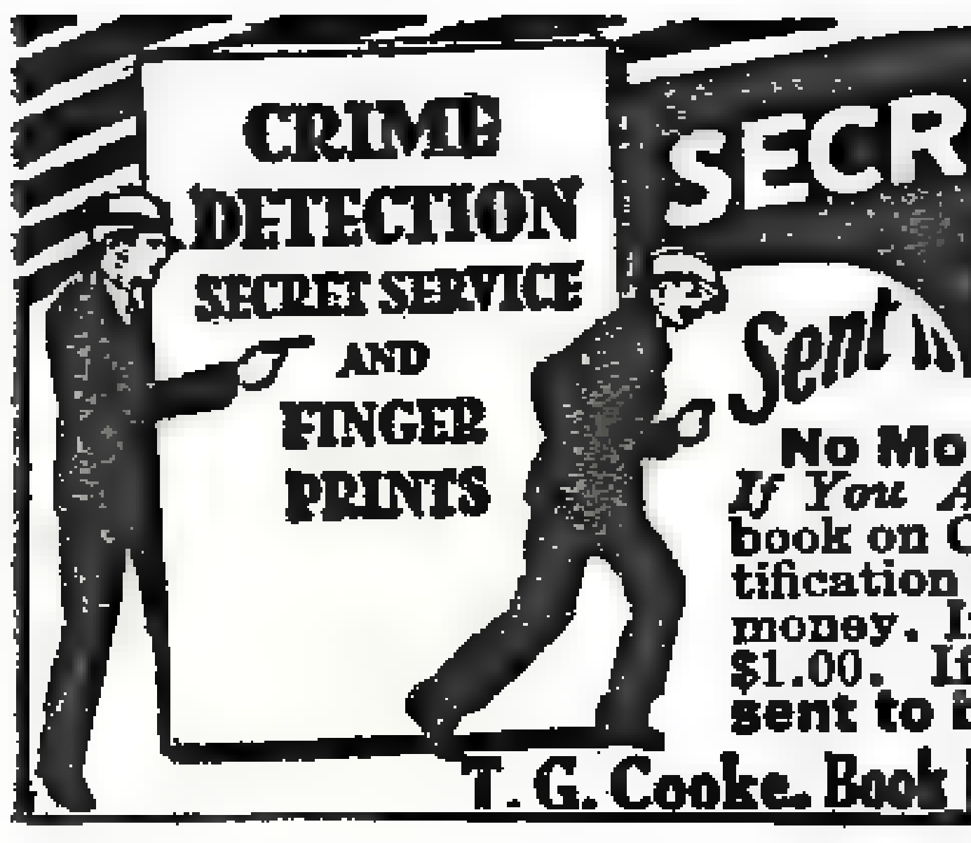
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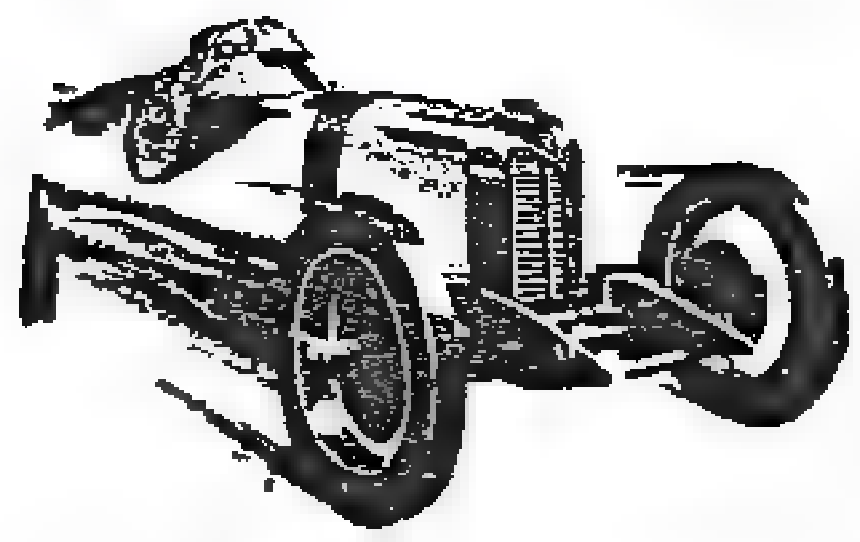

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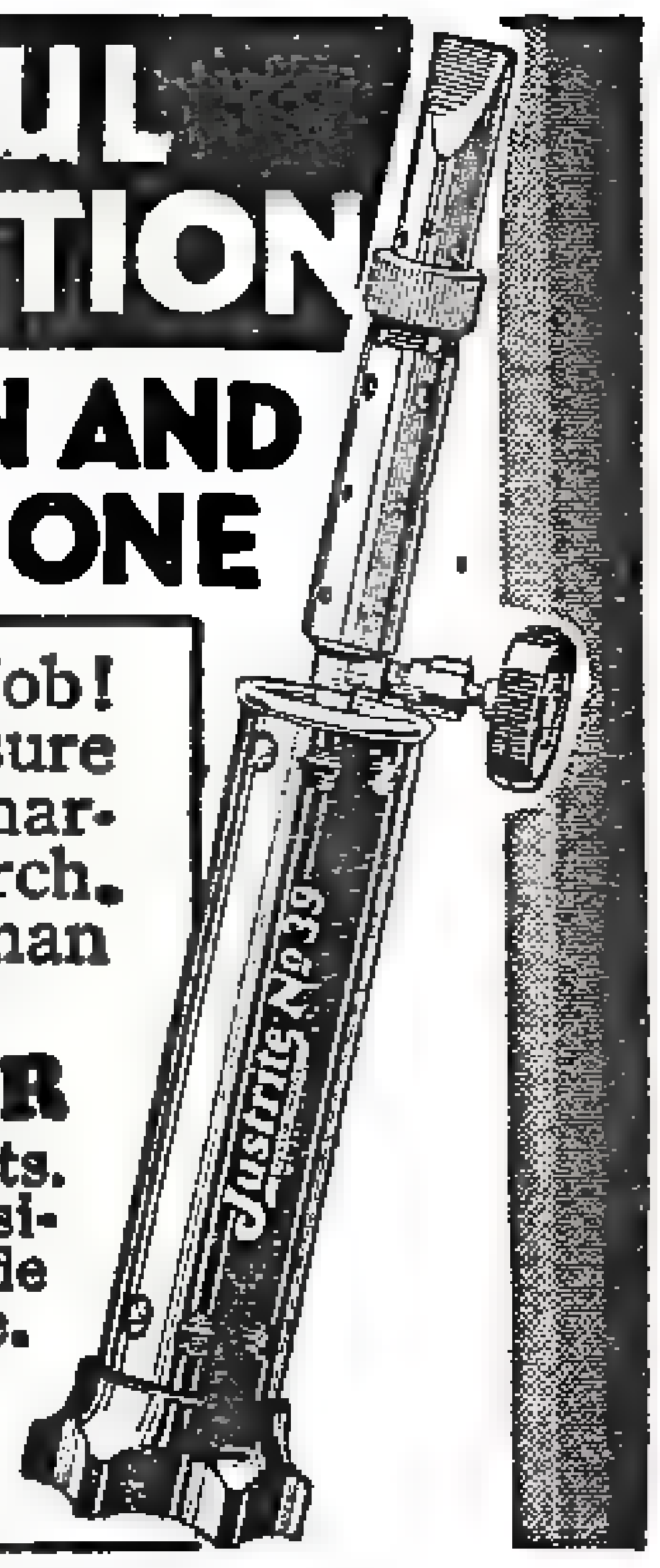

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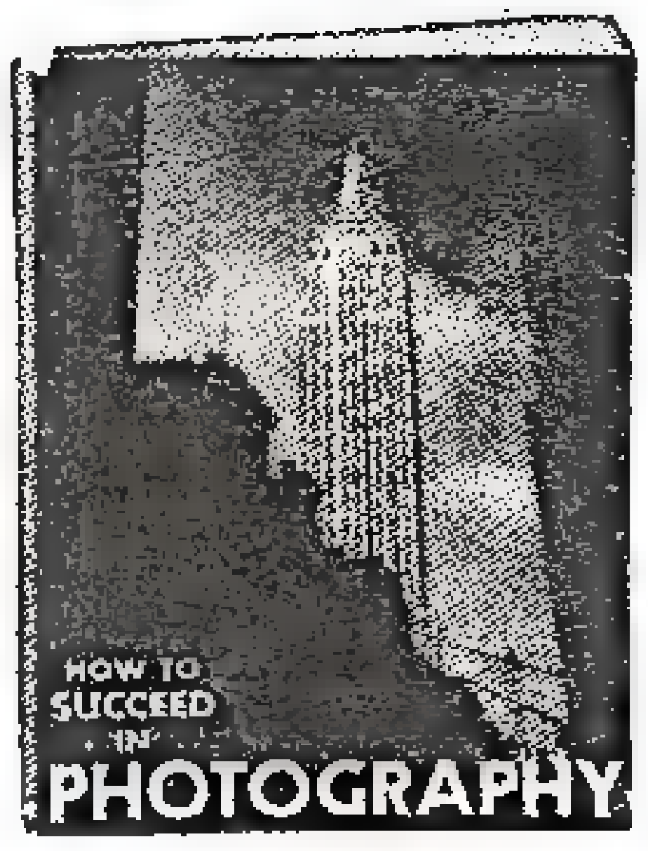

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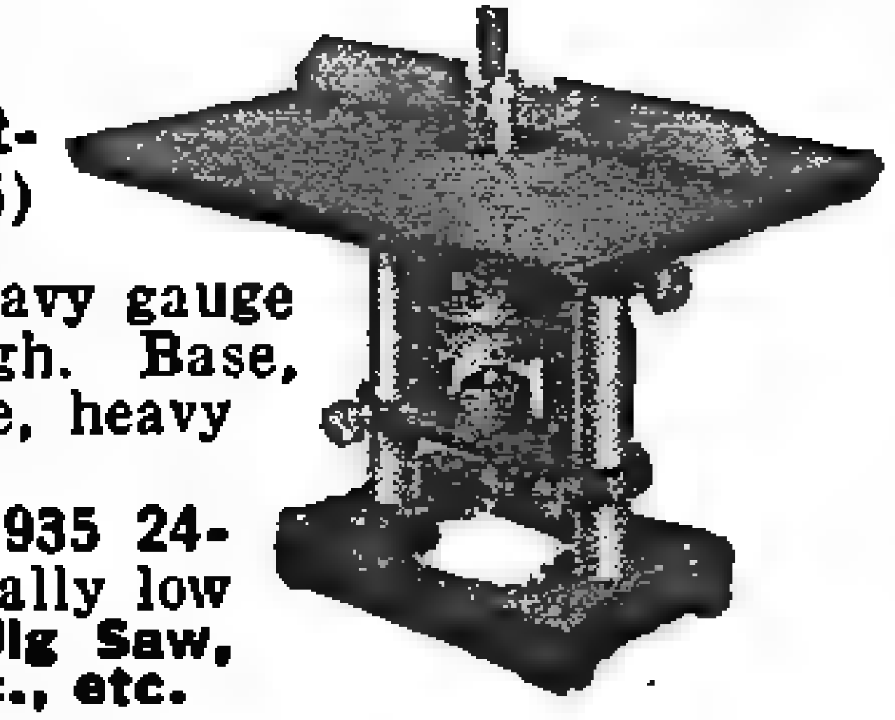

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2. What is first step in making application for patent?

3. How many patents were issued to Thomas A. Edison?

4. To what president was issued patent for expanding air-chambers to lift river boats over sand bars?

5. How many years does a mechanical patent remain in force?

6. How does the issuance of a patent protect the inventor?

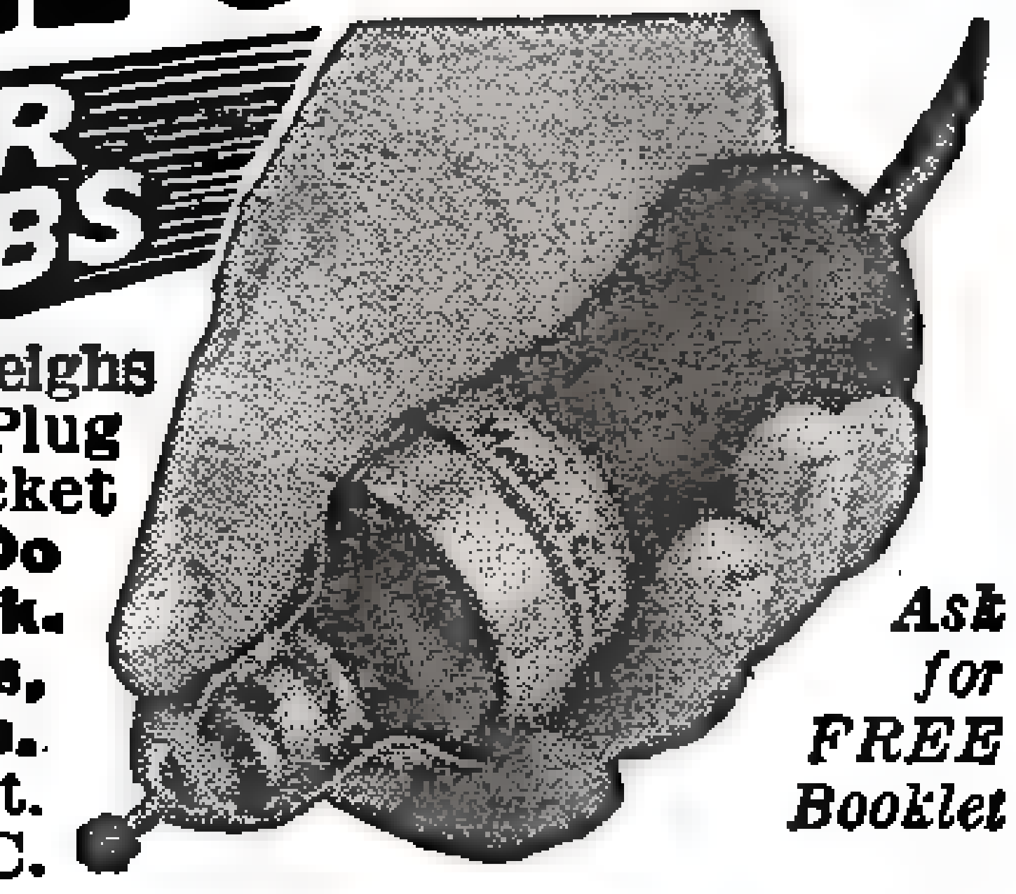
7. Is it compulsory to prepare a working model before making application for patent?

8. What is a "Record of Invention" form?

9. Why does the Patent Office advise applicants to employ registered patent attorneys?

10. When can an article be marked "Patent Applied For"?

For the answer to these questions and other information of value to you, look on page 138



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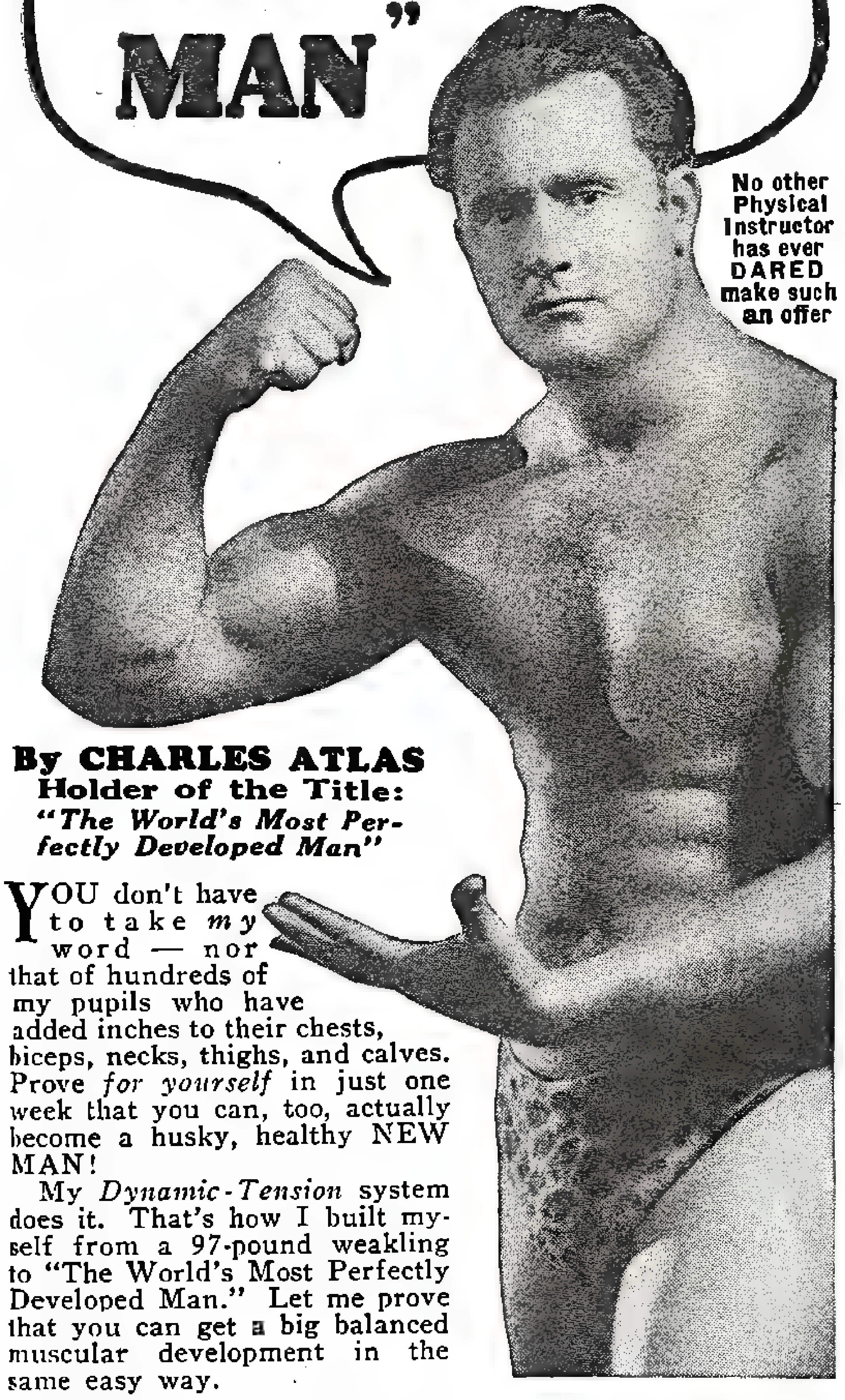

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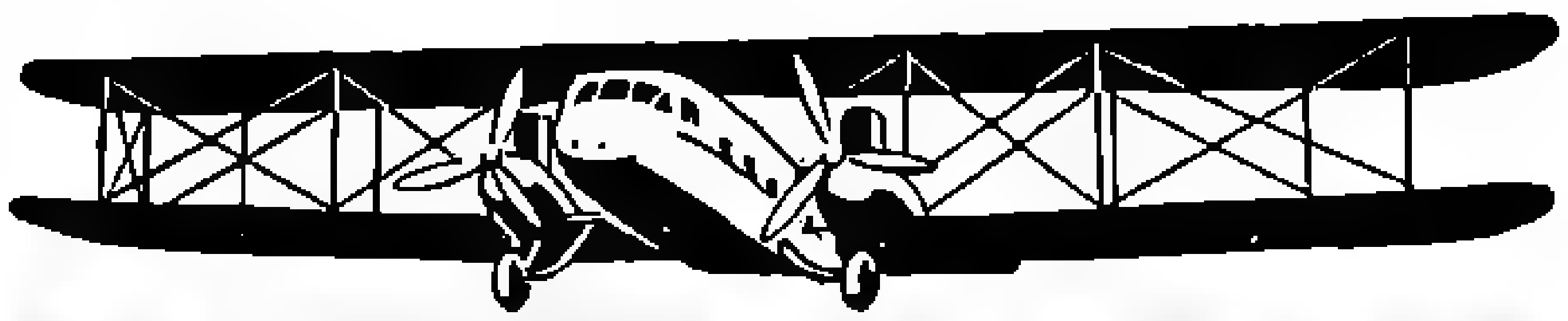

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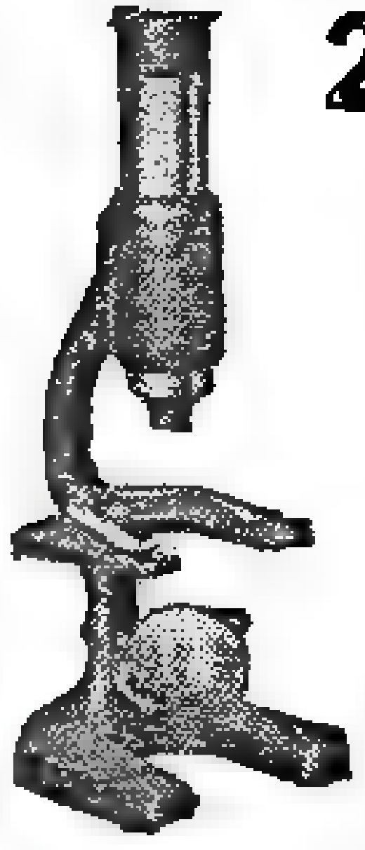

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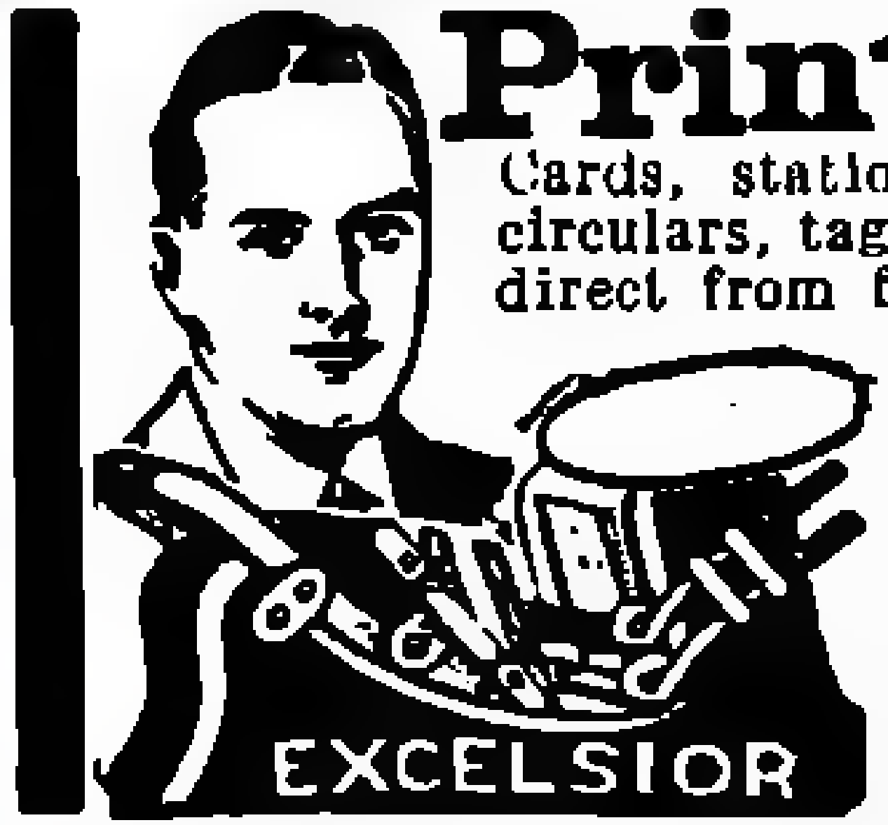

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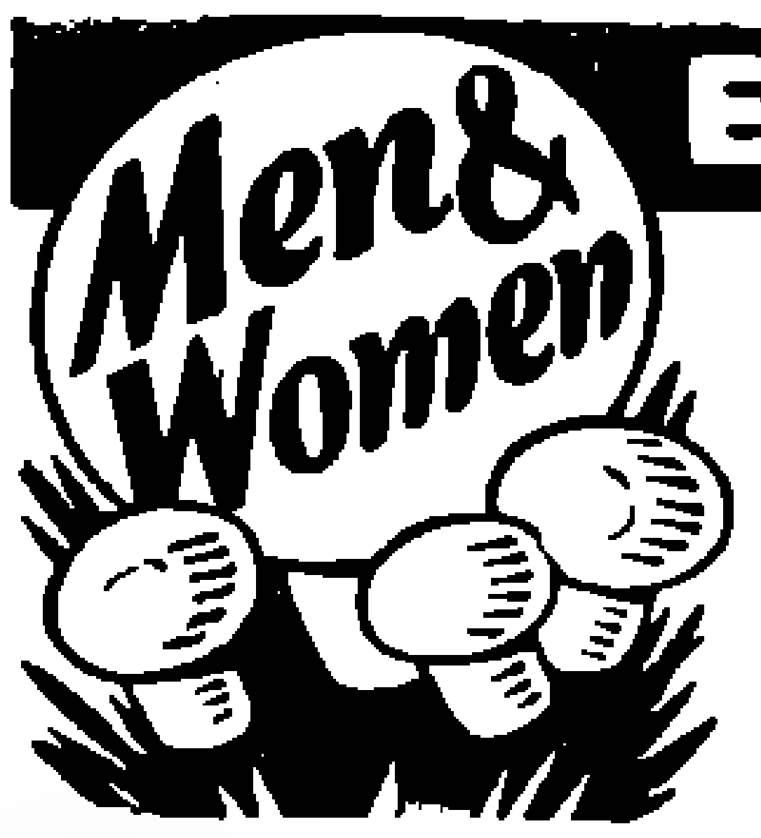

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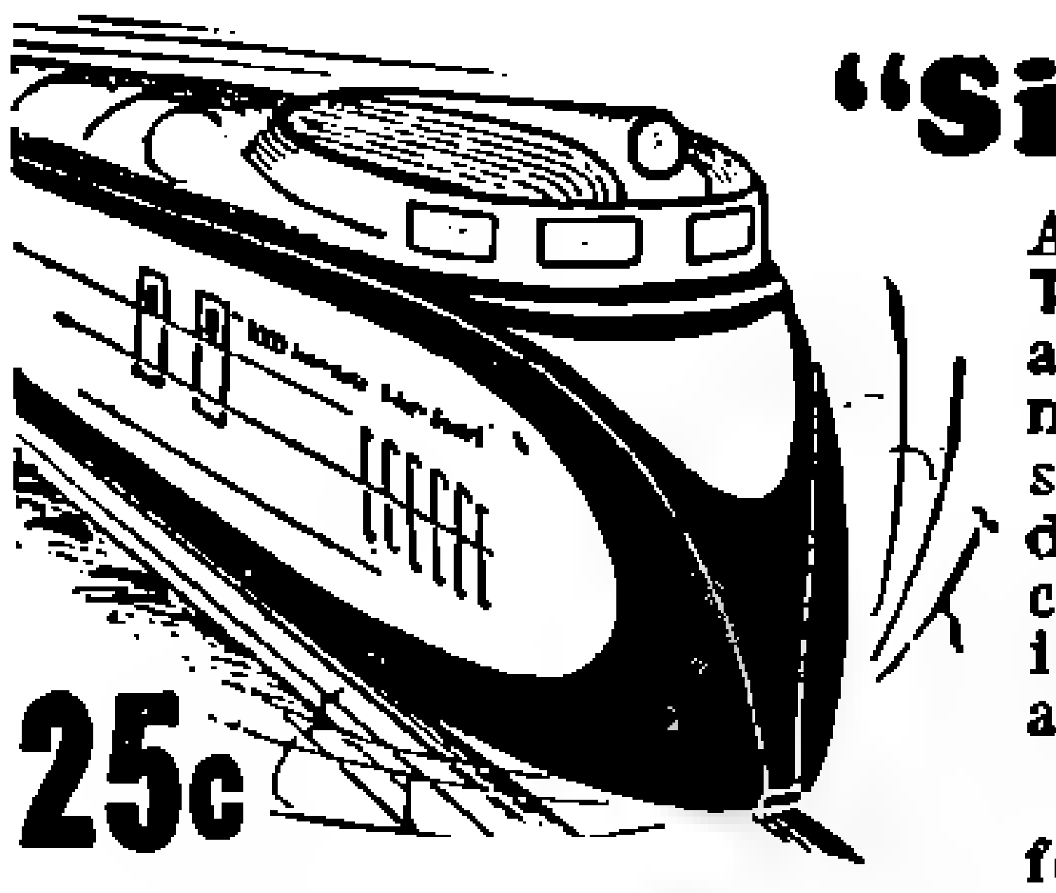

At last! The streamlined **Electric** Train you have always wanted at a fraction of the usual cost. Needs no tracks or transformer—a big saving. Runs equally well indoors or outdoors on ordinary dry cells. The **Silver Bullet** is finished in black and silver—neat and flashy.

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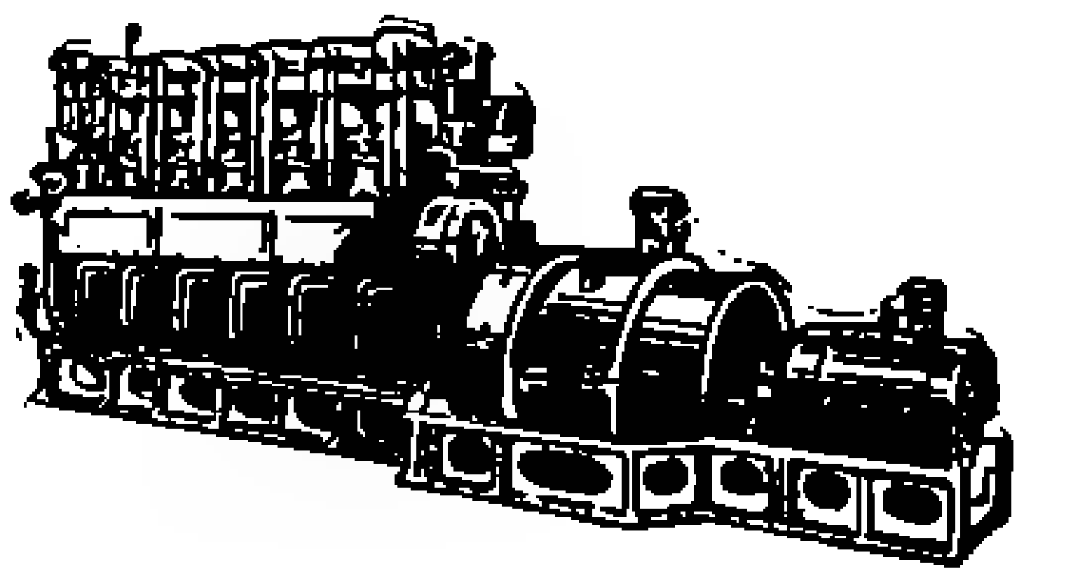

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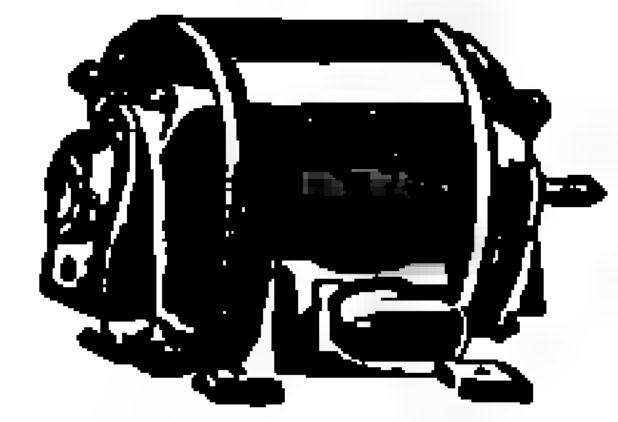
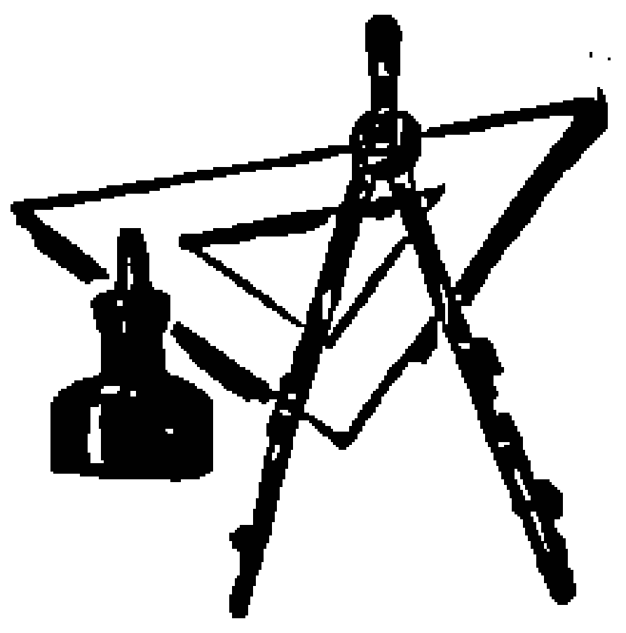


The new course in Electrical Engineering covers this fascinating field thoroughly. If you are just starting or are partly on the way to a real paying position in this industry, this new course brings the broader knowledge necessary for advancement. The coupon brings complete information.

MECHANICAL ENGINEERING

—A Field with a Future



This course has meant advancement to hundreds of ambitious men, mechanics, draftsmen, blacksmiths, foundrymen, patternmakers, apprentices, and mechanical engineers—men who wanted to get ahead and to earn more money. You will find, as they have found, that enrolling for an I. C. S. Course is an investment in a Bigger Future. Use the coupon!

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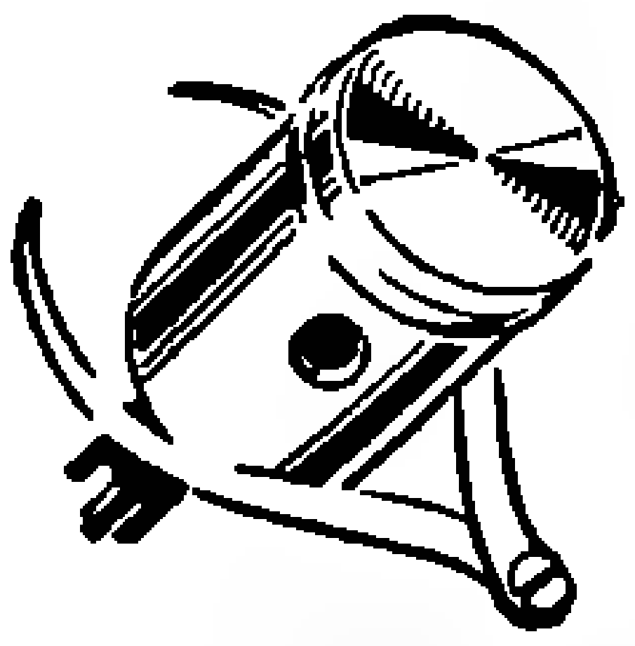

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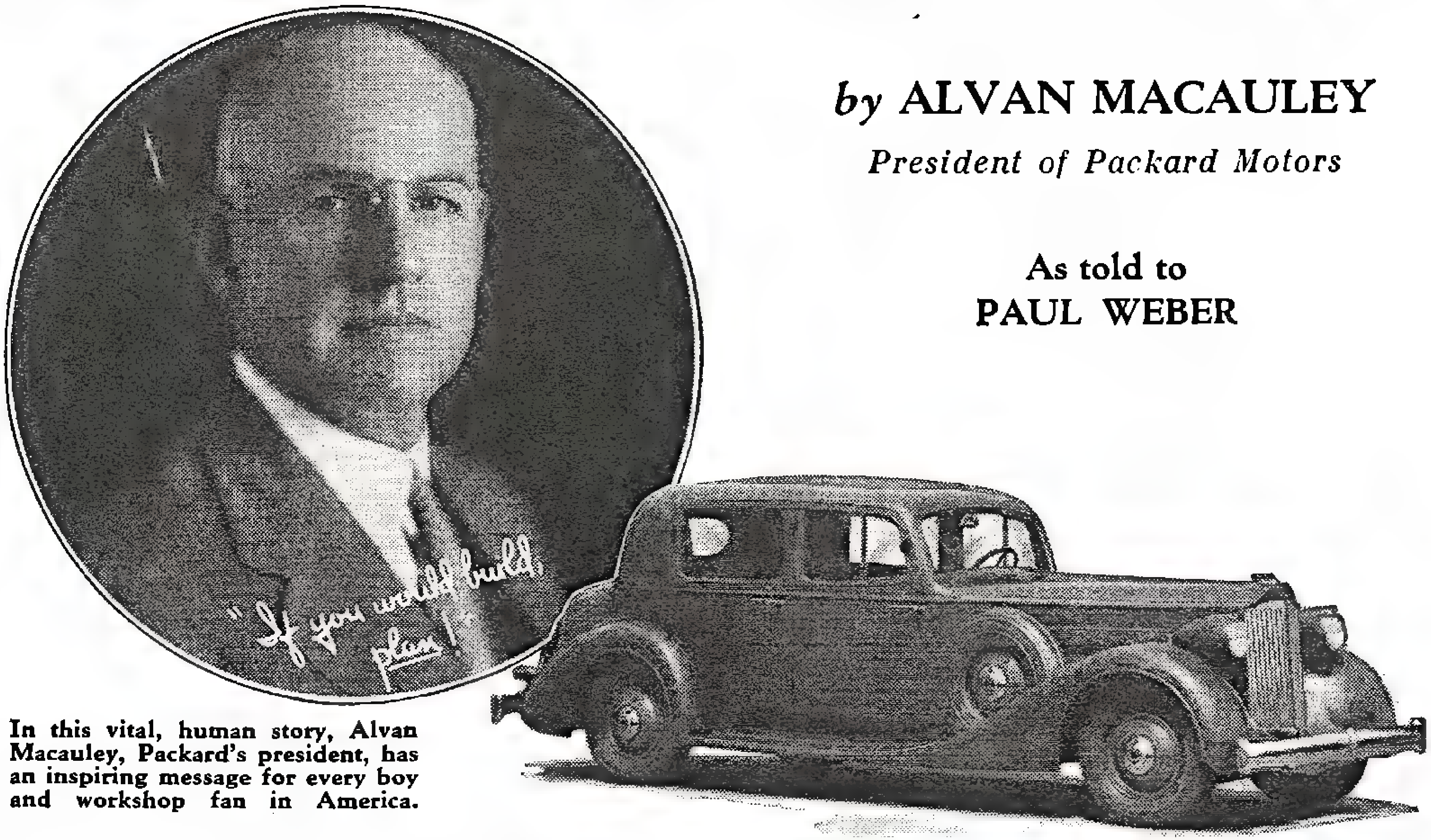
PACKARD'S PRESIDENT

by ALVAN MACAULEY

President of Packard Motors

As told to
PAUL WEBER


"If you would build, plan!"

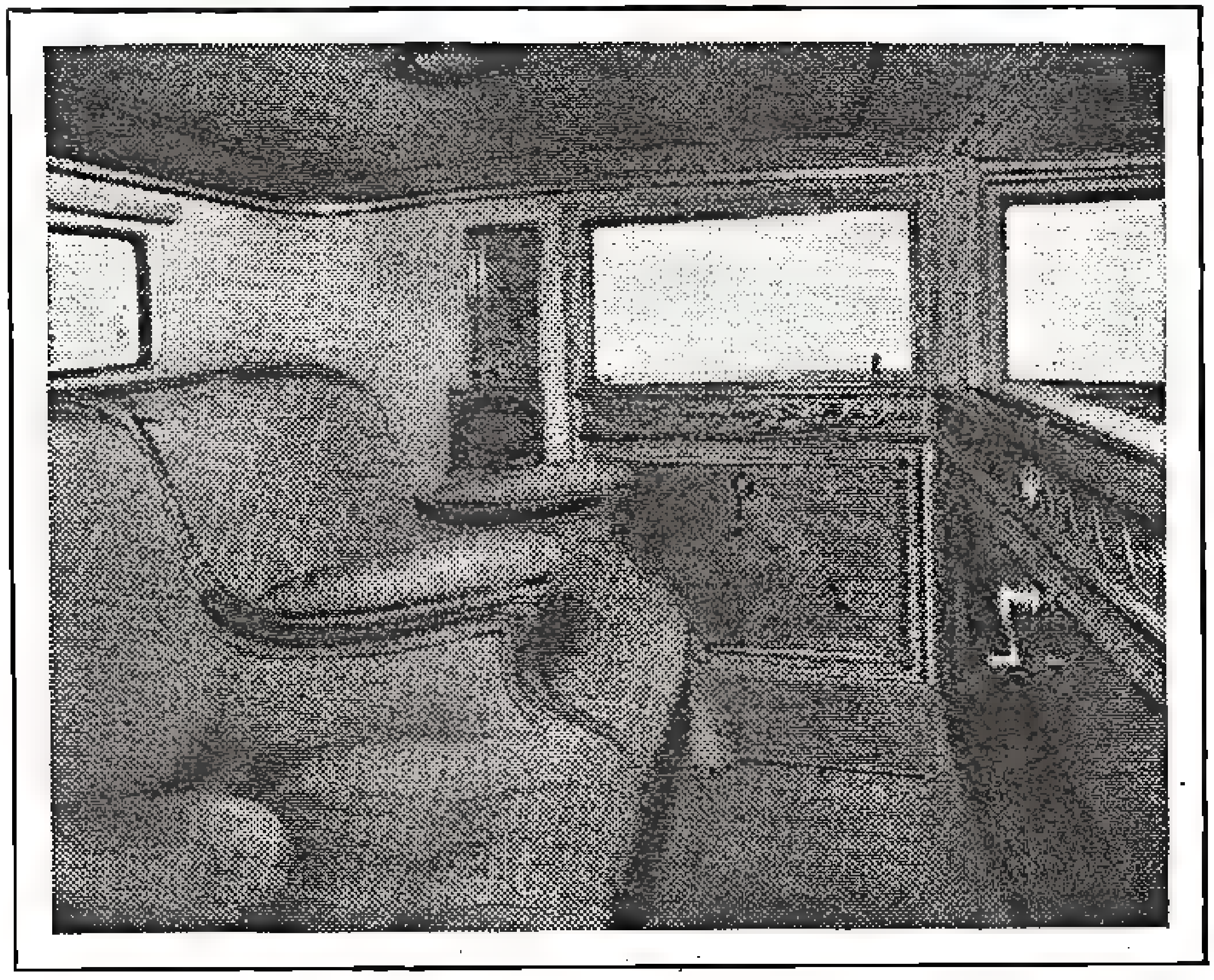
In this vital, human story, Alvan Macauley, Packard's president, has an inspiring message for every boy and workshop fan in America.

WHEN I was asked to tell readers of Modern Mechanix and Inventions something about the home workshop in which I have spent so many pleasant hours, I at first refused. I could see no particular good in discussing my own personal addiction to a hobby which is so widespread among the men of America, young and old—the hobby of building things with tools.

After some consideration, however, it appeared that I might well change my mind, for two reasons. First, because I believe I have learned one lesson in my workshop which I would like to pass on, particularly to younger readers; and secondly, because (as my young grandsons have often pointed out to me) my workshop is probably just the sort of place every boy dreams about. Possession of it seems to entail some responsibility toward others of the plane-and-chisel fraternity. I suppose anyone who possesses something dear to the desires of millions of boys ought to be willing to talk about it.

Therefore, much as I dislike to talk about myself, I resolved to do so for once on the theory that in this case the end might justify the means.

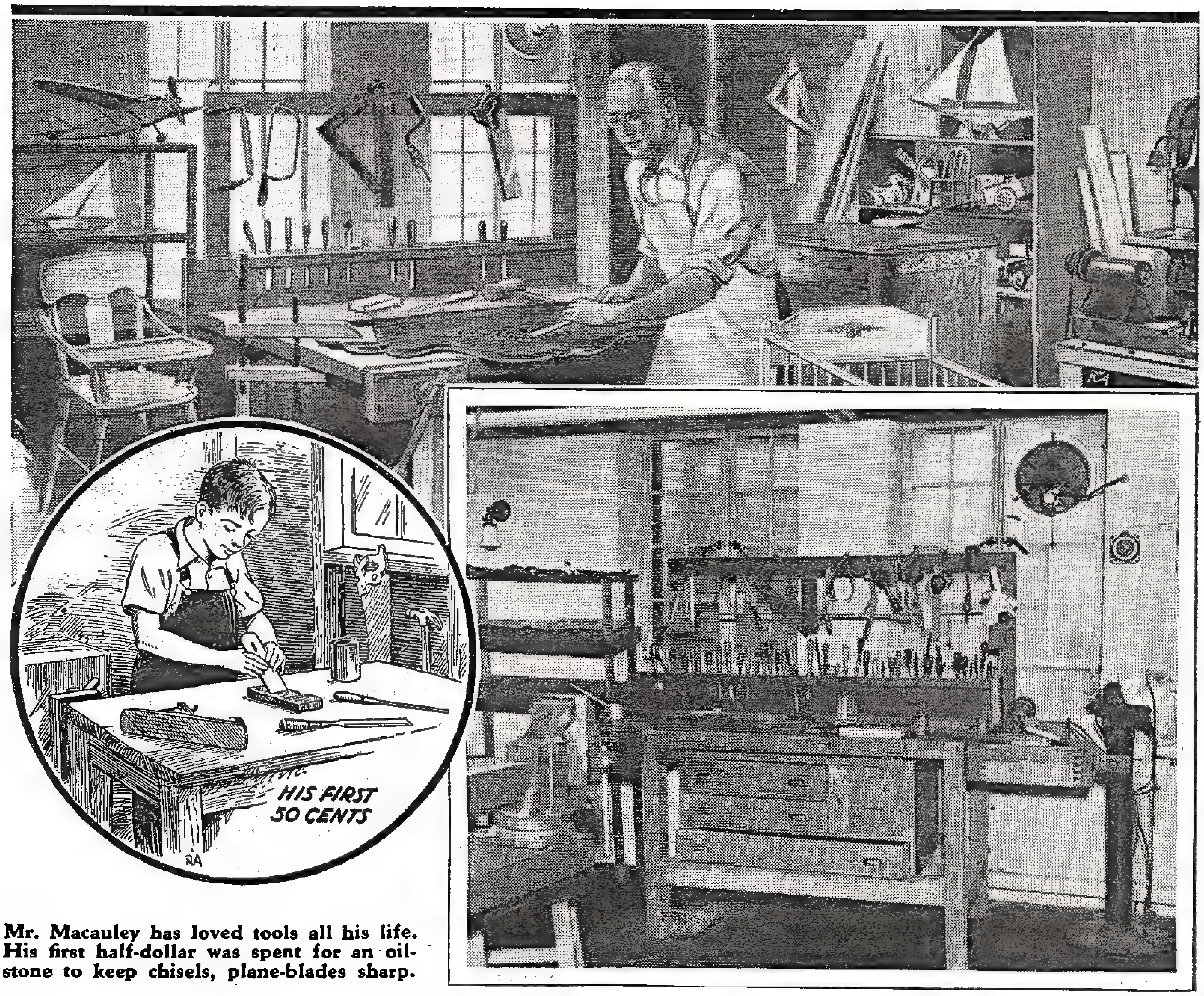
I have possessed tools of some sort ever since I was old enough to appreciate them. I think I spent the first half-dollar I ever earned for an oil-stone to sharpen my chisels and plane-blades. From the first my liking for tools took a bent toward woodworking, principally because wood is the easiest material for the amateur artisan to work and because it gives excellent results with a minimum of equipment.



Many of the refinements which grace Packard interiors, such as the carved paneling shown above, were inspired by ideas born from Alvan Macauley's home workshop hobbies.

My early activities in that line naturally inclined my mind toward the drawing-board, and for some time while studying law at George Washington university I was employed part time in a draughtsman's office in Baltimore. At the same time, because of my youthful love of the saw and chisel, I became interested in the study of woodworking as an art. The subject has held my attention ever since and a considerable section of my library is devoted to works dealing with the history of fine furni-

tells How Workshop Hobbies win Success!



Mr. Macauley has loved tools all his life. His first half-dollar was spent for an oil-stone to keep chisels, plane-blades sharp.

In the photo and drawing above is shown a section of the home workshop in which Mr. Macauley builds cribs, highchairs and toys for his grandchildren, and beautifully carved pieces of period-design furniture as gifts for friends.

ture and the technique of the craft.

When I built my present home on the shore of Lake St. Clair in Grosse Pointe, Michigan, I provided plenty of space in the basement to accommodate my work benches and tools. The shop now contains lathes, vises, band-saws, planes, drills, chisels, etc., enough to handle almost any kind of woodworking job I would care to attempt.

During recent years, the pressure of affairs has prevented me from spending a great deal of time at my bench and lathes. But I can look back upon—and forward to, I hope—many happy hours spent in the shop.

One of my greatest pleasures has been to build things for my eight grandchildren, two of whom are boys, just at the tool-loving ages of seven and ten. For the children I have built high-chairs, cribs, small chairs, and numerous toys, including an armada of toy boats.

My other workshop projects have been chiefly pieces of carved furniture which I tried to make true to some period design. These were usually given away to friends —who, of course, *had* to be very much pleased.

Quite frequently, business and pleasure find a common ground in my workshop. Many of the ideas I have contributed to the interior finishing of Packard automobiles—especially custom body jobs—have had their inception while I was chiseling away at some project in my basement.

Every boy who shows a love of working

When Alvan Macauley built this beautiful home on Lake St. Clair, Grosse Pointe, Mich., he saw to it that ample space was provided in the basement for his shop and tools.

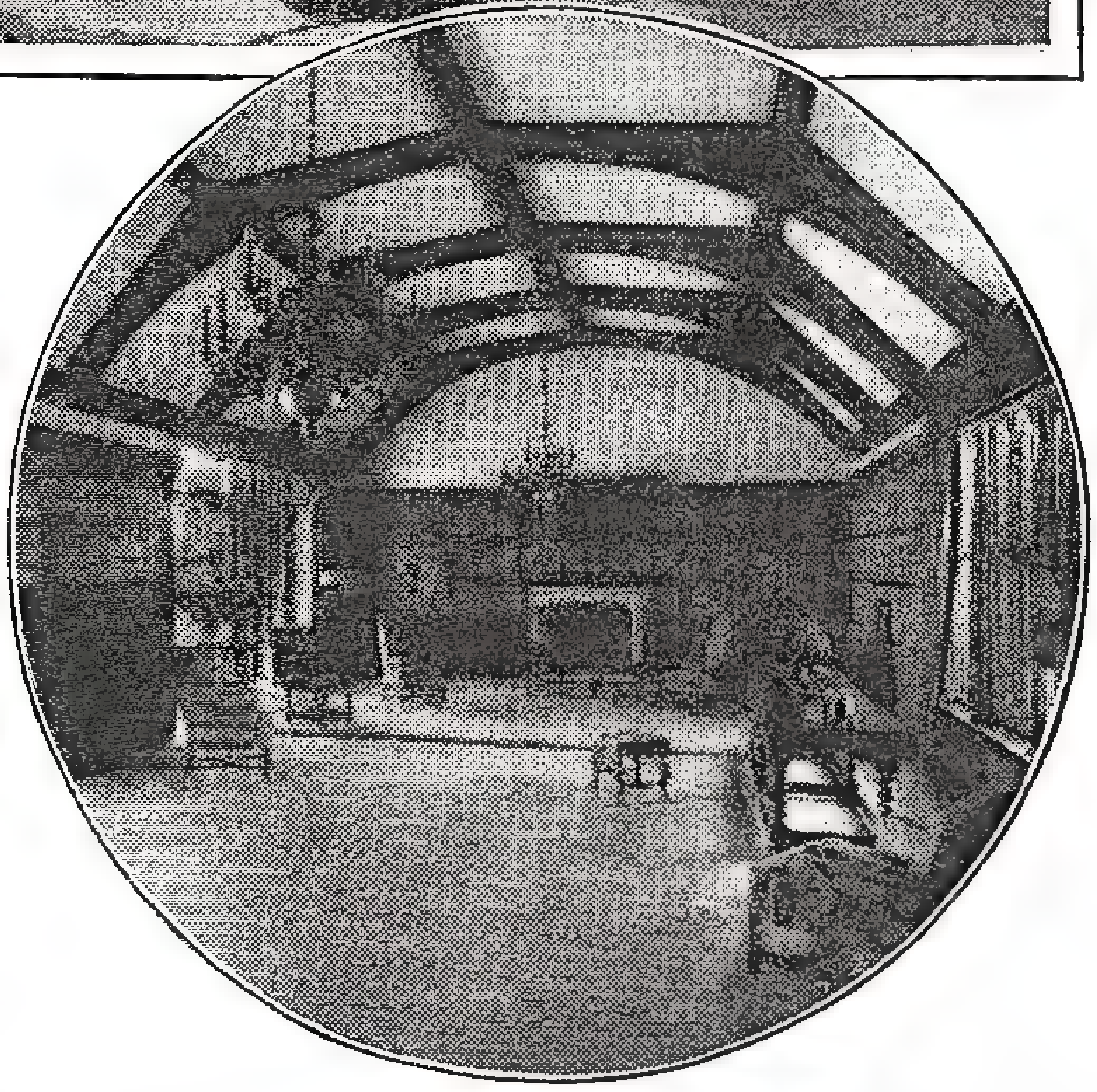
with his hands should have a workshop, even though it be no more than an old kitchen table, equipped with a saw, hammer and jack-knife. I say that because I know from experience what important things a man can learn while working with his tools. The process of conceiving and executing one's own designs with one's own hands cultivates invaluable habits of carefulness, precision and self-reliance.

I believe, however, that the most valuable habit a workshop can teach is the habit of doing things *according to plan.* Every small boy has known the disappointment of trying to build a doghouse or a model airplane without first making a plan, either on paper or, if the job be very simple, in his imagination. Of course, it is futile to try to construct a piece of fine furniture without first setting its every dimension and contour down on paper. That is why the draughtsman's pencil always precedes the chisel of the artisan.

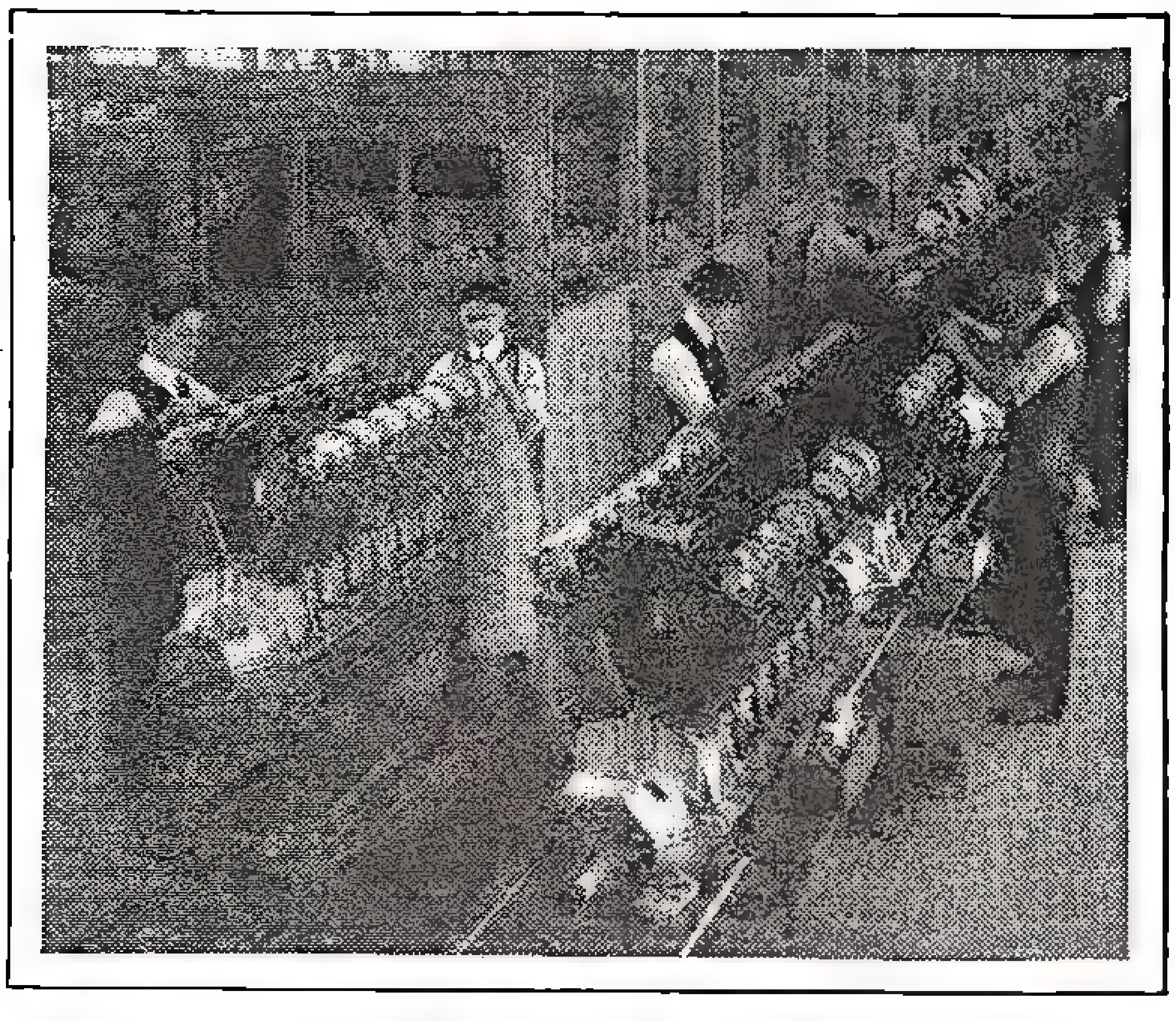
If a youth can learn the importance of planning from having a workshop of his own, a small expense in tools and space will certainly pay him heavy dividends. For I have found that this habit of making a plan before starting to build is just as necessary to the conduct of a business as it is to the construction of a desk or table in my shop. Plans do not always work out as expected. But when there is no plan, the usual result is that nothing works out.

If you will pardon my going into the history of the Packard Motor Company, I

(Continued on page 141)

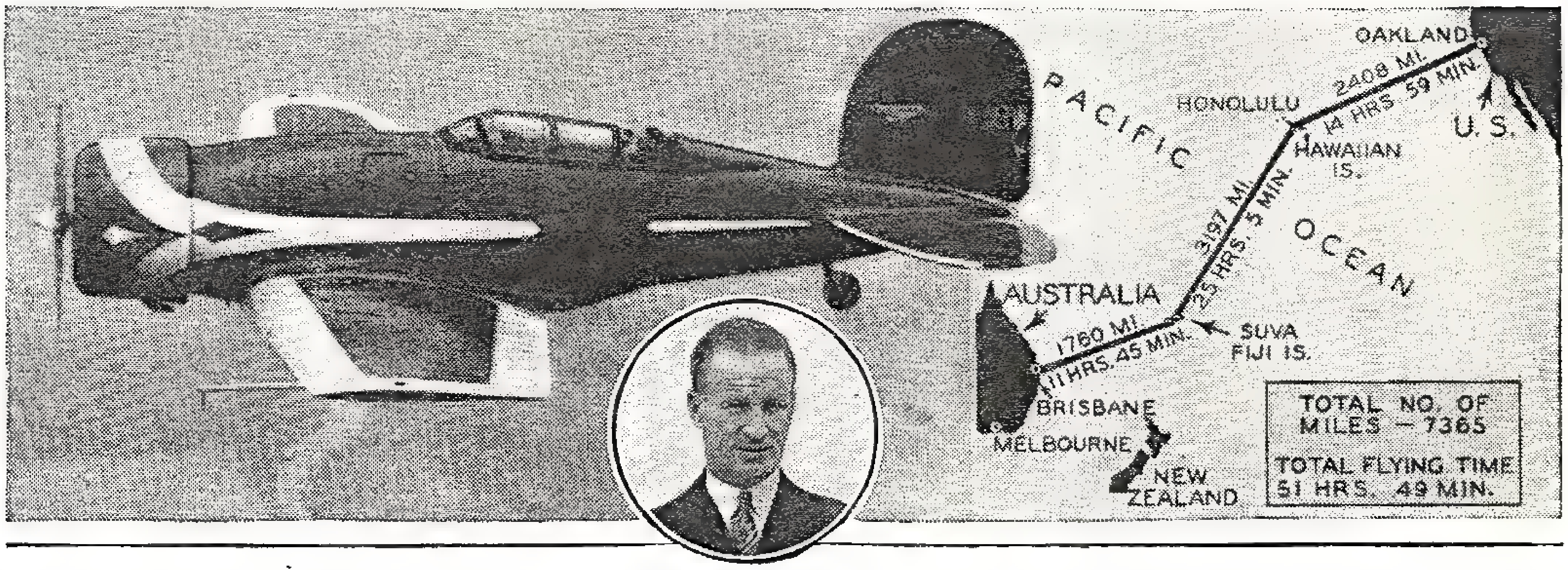


The Macauley living room. Note the beamed ceiling and paneling, illustrative of his love of fine craftsmanship.



The Liberty engine assembly line during the World war, when Packard first turned to mass production methods.

Kingsford-Smith Makes Record Pacific Hop



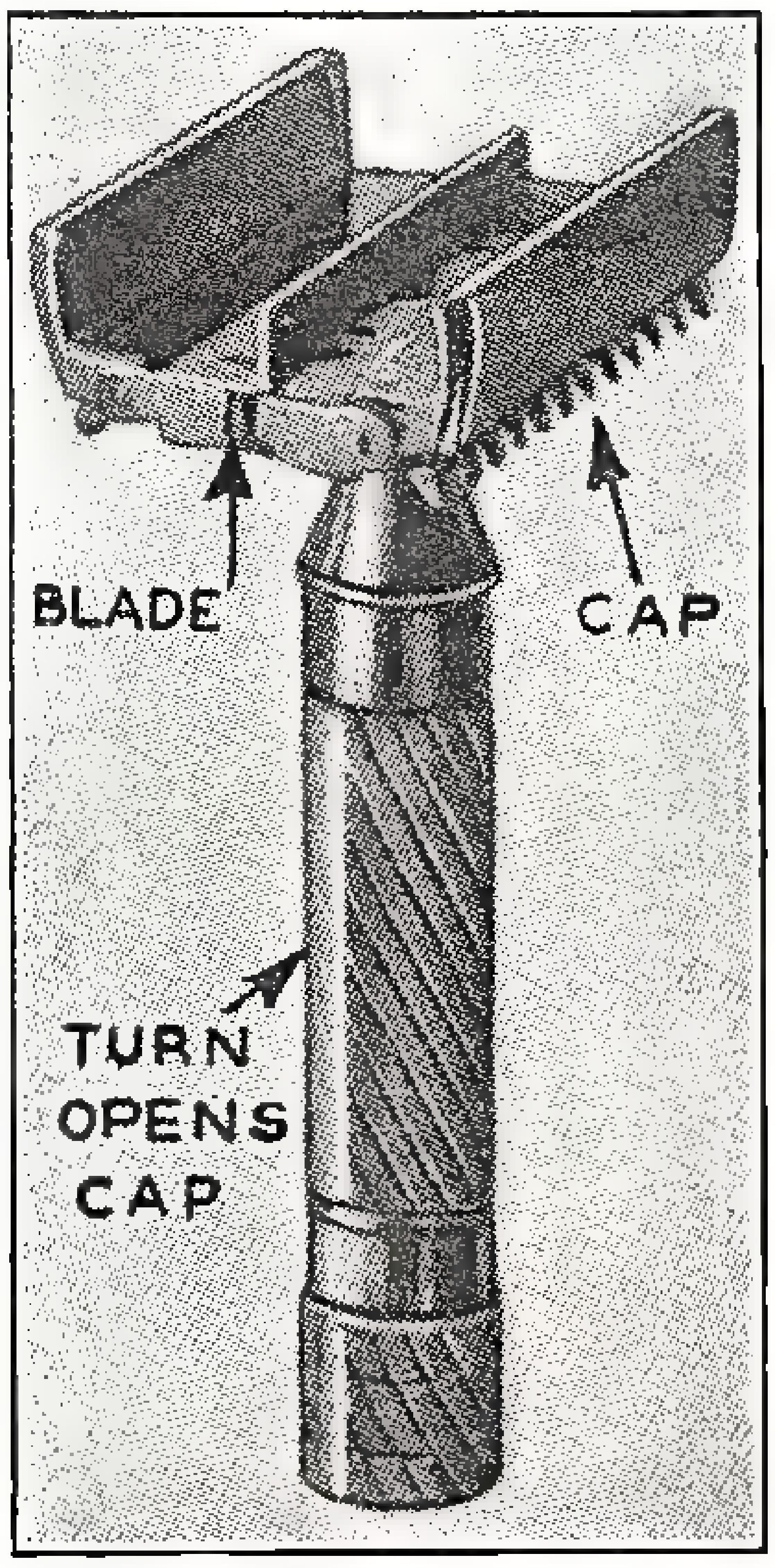
Lifting his Lockheed monoplane, the "Lady Southern Cross," into the air over the world's largest ocean, Sir Charles Kingsford-Smith and his navigator, Capt. P. G. Taylor, hung up a total of 7365 miles in less than 52 hours' flying time.

PILOTING an American-built Lockheed Altair monoplane, Sir Charles Kingsford-Smith and his navigator, Capt. P. G. Taylor, recently set a new flying record by hopping from Brisbane, Australia, to Oakland, Calif.

A total of 7365 miles was covered by the intrepid airmen in less than 52 hours' flying time, with stops at Suva and Honolulu.

The flight was not without its dangers. On the 3197 mile leg, Suva to Honolulu, generally conceded to be the most dangerous over-water air course in the world, the fliers encountered a torrent of equatorial rain which forced the ship into a tailspin. Only quick work on the part of the men averted a crash landing in the sea.

Handle Opens One-Piece Razor



Blade receptacle opens and closes by twisting razor handle.

HAILED as distinctly revolutionary in design, a new one-piece safety razor has been placed on the market.

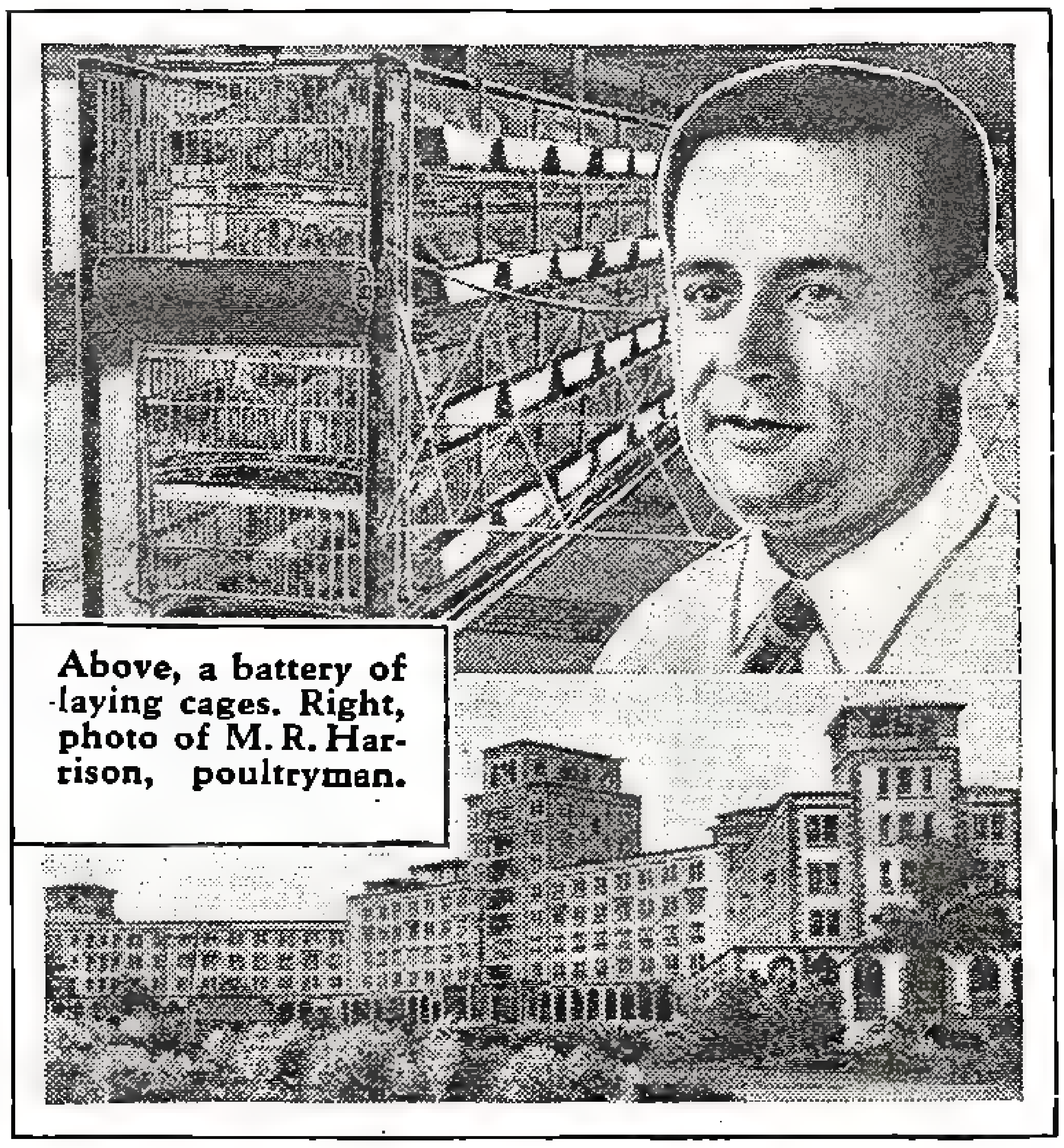
Compactly built, the razor has no separate parts and is said to be extremely simple in operation. A twist of the handle opens the cap of the razor to receive the blade. Another twist closes the blade receptacle, preparatory to shaving. The appearance of the razor is enhanced by a plating of gold.

Chicken Guests Fill Miami Hotel

ABANDONED by a real estate syndicate, a Miami hotel has been turned into one of the world's largest and most palatial chicken coops by the ingenuity of Maurice R. Harrison, graduate engineer turned poultryman.

Securing a long-term lease on the property following its abandonment by the original owners, Harrison installed batteries of wire cages and promptly populated the hotel with about 60,000 chickens.

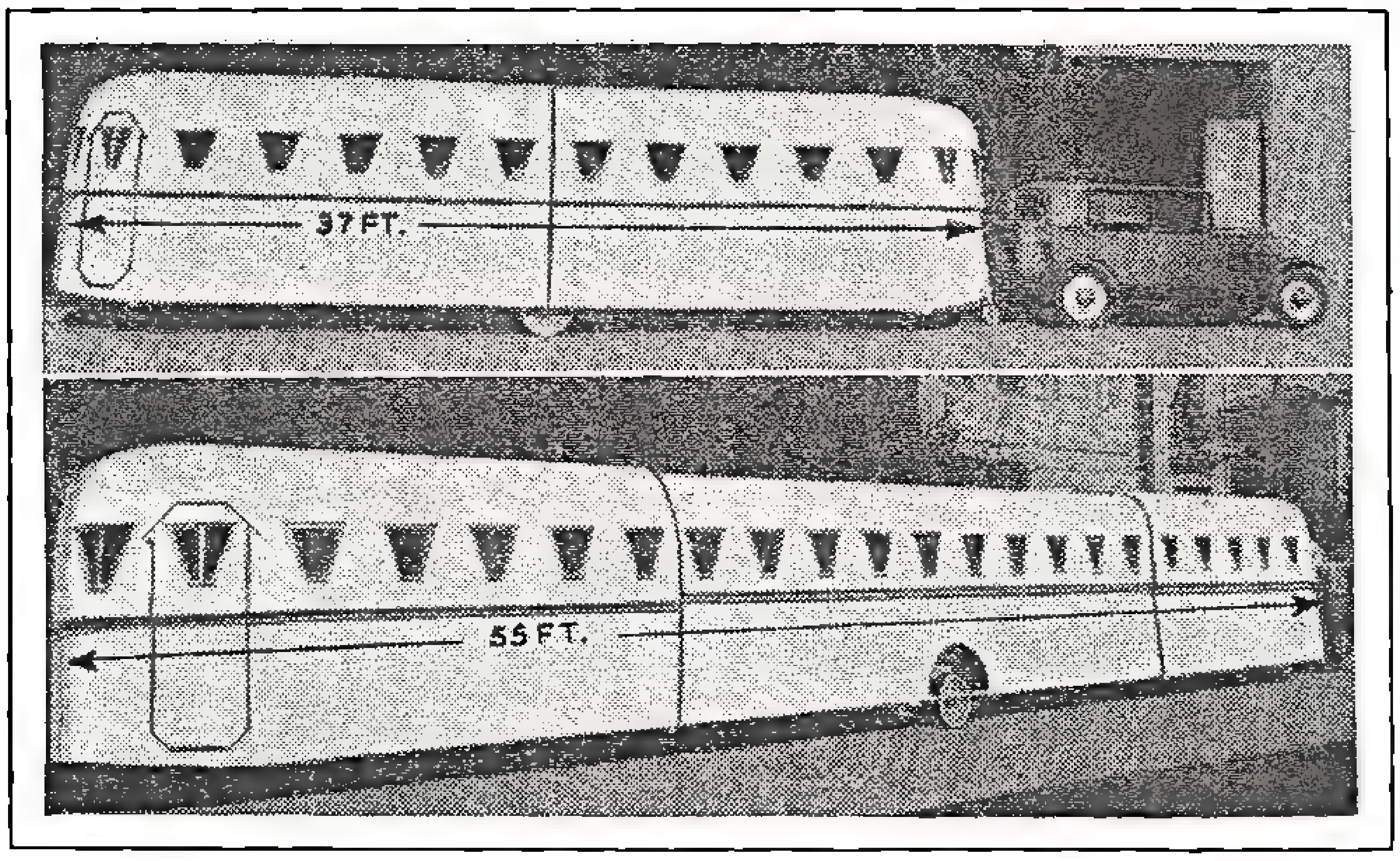
Each hen has an individual compartment. supplied with a private feed trough and a drinking fountain of freshly flowing water. Floors of the laying cages are slightly at an angle, permitting eggs to roll into a convenient trough to speed egg-gathering.



Above, a battery of laying cages. Right, photo of M. R. Harrison, poultryman.

Abandoned by a real estate syndicate, this Miami hotel has been converted into the world's most palatial "hencoop."

Telescope Trailer Shrinks or Grows at Will of Operator



A French inventor has solved the problem of devising a traveling home and workshop with this telescope trailer which may be extended from 37 to 55 feet. Top photo shows normal length of trailer; lower photo, extended.

BY MEANS of a light screw-jack said to be easily manipulated by a child, a new telescopic trailer in Nice, France, may be shortened or extended to suit the owner's requirements.

The trailer is 7 feet wide with a normal length of 37 feet. When the double extending leaf at each end is pulled out, however, the length is increased to 55 feet. The trailer rests on a single axle without support fore and aft, but perfect equilibrium is said to be maintained.

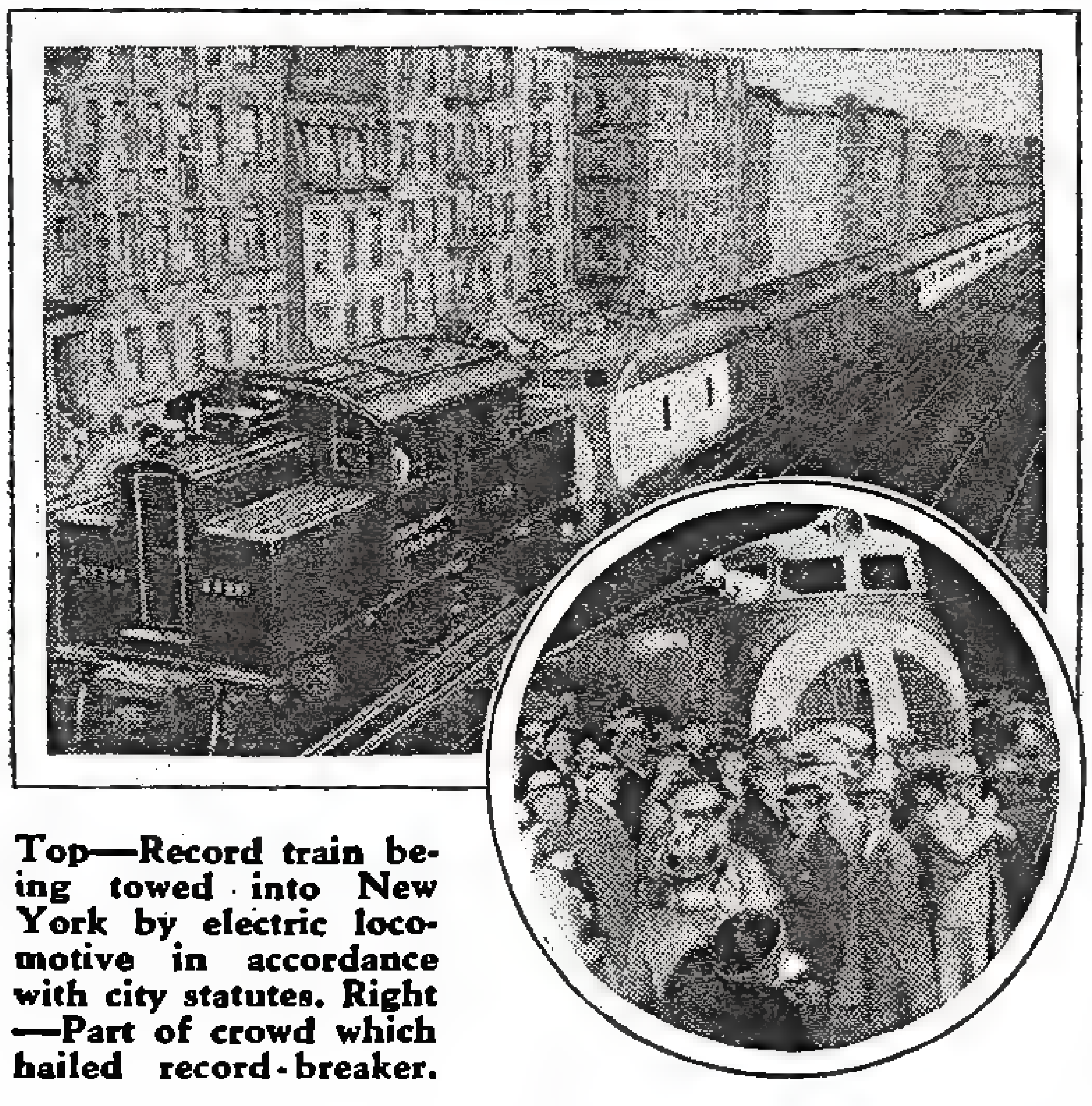
Used as living quarters, workshop and showroom by a French inventor, the total weight of the carriage plus its furniture is only 5000 pounds. The body consists of 15,000 pieces of wood glued together, overlaid by a layer of linen cloth and varnish.

Train Sets Record Across U. S.

COMPLETING a cross-country run of 3258 miles from Los Angeles to New York in 56 hours and 55 minutes, the Union Pacific's bullet train, M-10001, recently hung up the fastest coast-to-coast run ever made on rails.

One full day was cut from regular express schedules by the M-10001 which climbed grades in the Rockies at 50 m.p.h. and scorched across the plains between Dix and Potter, Neb., at a speed of 120 m.p.h.

The bullet train's engine is a V-type Diesel used in combination with electric power. A 12-cylinder, two-cycle Winton engine, delivering 900 h.p., drives a generator which furnishes power to four electric traction motors. The train is composed of six cars and has a total weight of 200 tons as compared with 700 tons for a steam train of similar size. A regular 40-hour schedule is planned between Chicago and the Pacific coast.



Top—Record train being towed into New York by electric locomotive in accordance with city statutes. Right—Part of crowd which hailed record-breaker.

Outboard Powers New Motorsled

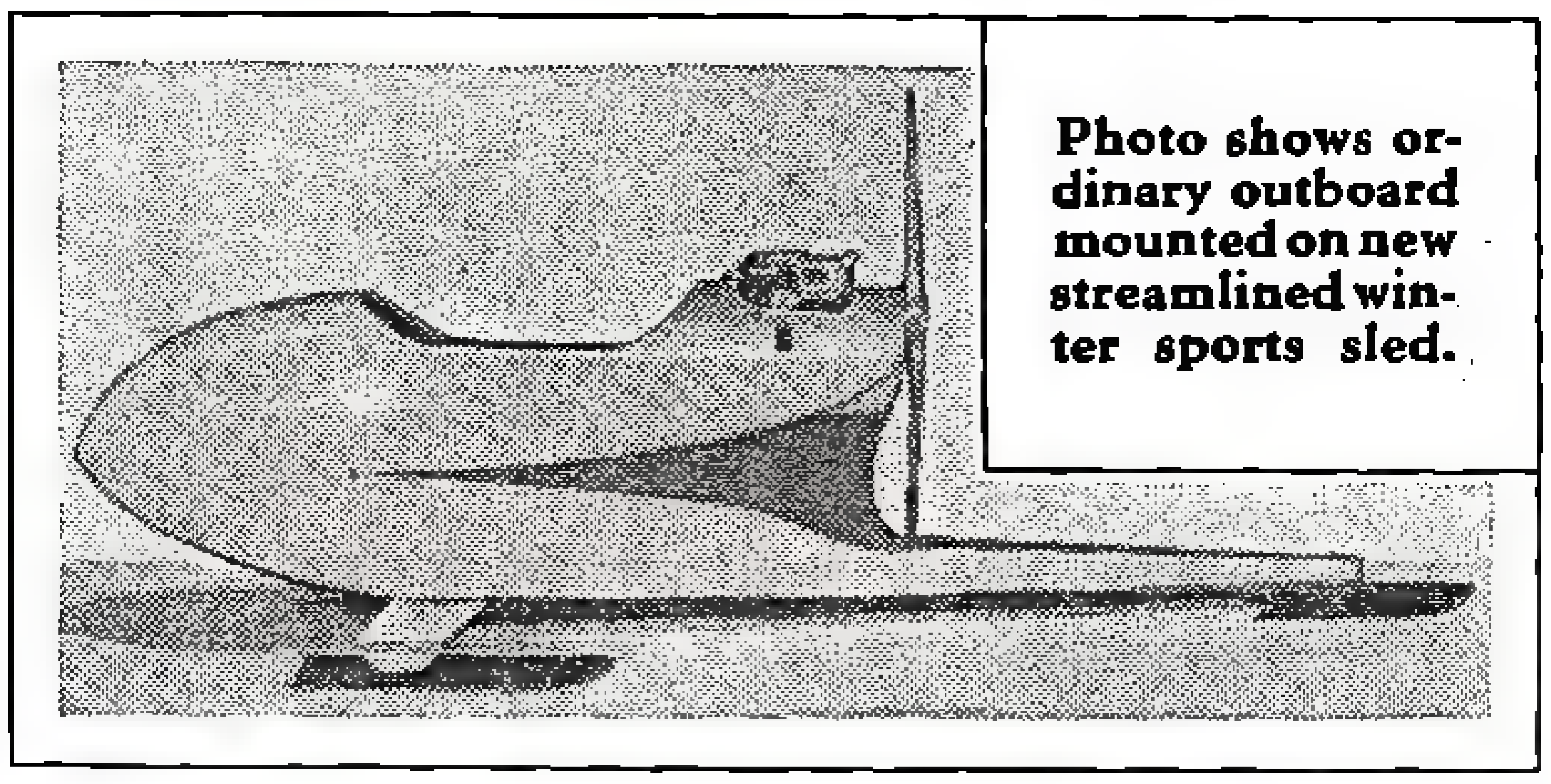
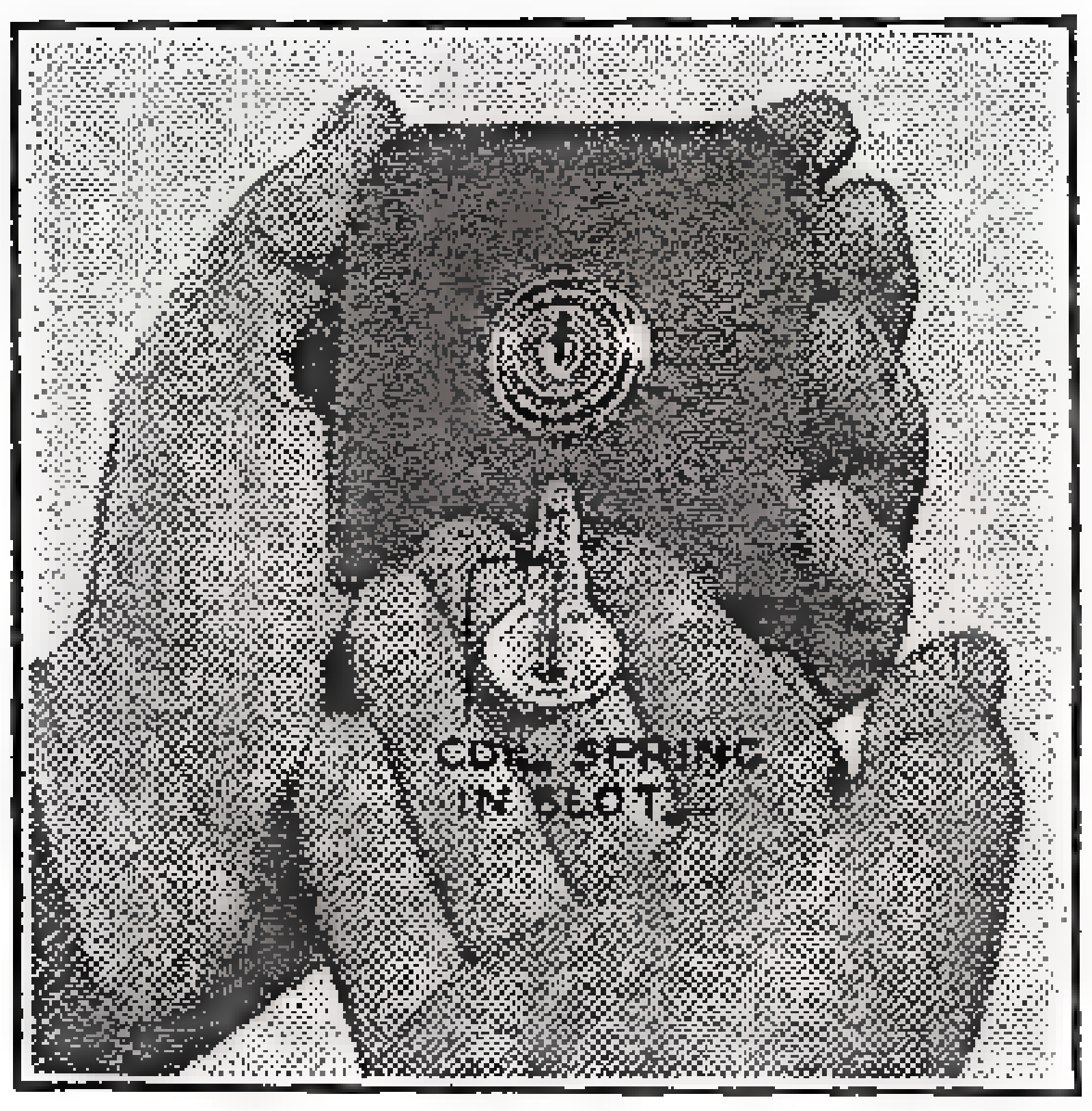


Photo shows ordinary outboard mounted on new streamlined winter sports sled.

NEW thrills await winter sportsmen in a streamlined sled which is powered by an ordinary outboard motor. Conversion of the motor from boat to sled is said to be a simple matter. In test performances a 2½ h.p. outboard twin turned a prop at 2000 r.p.m., delivering a thrust calculated to drive the sled at a speed averaging from 35 to 40 miles per hour.

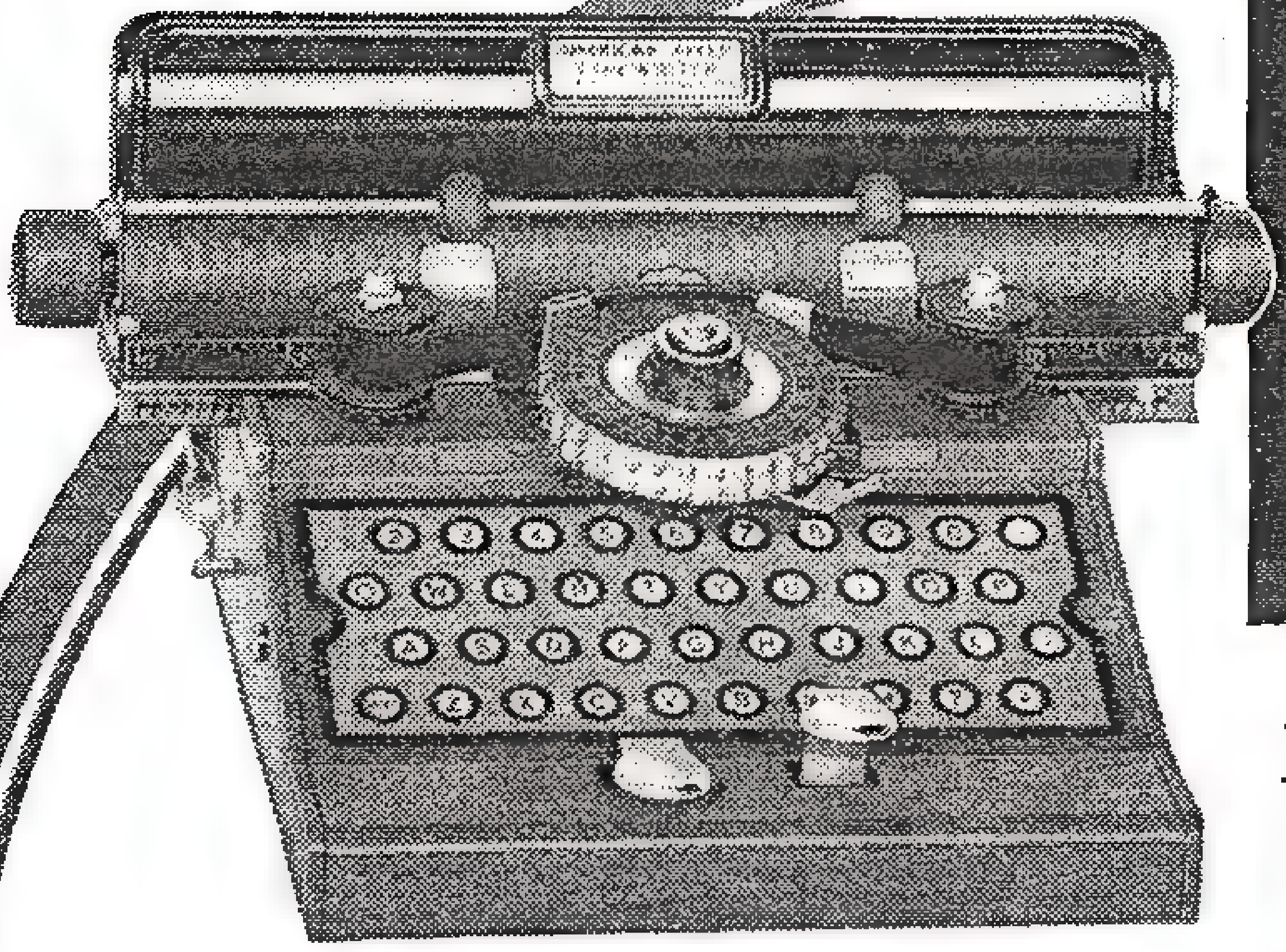
Spring Makes Key Self-Ejecting

A BOON to autoists who have a habit of leaving their keys in the lock is a self-ejecting key which shoots back into the hand. A strong spring installed in key's slotted shank coils as key is inserted, furnishing ejecting power as key is straightened.



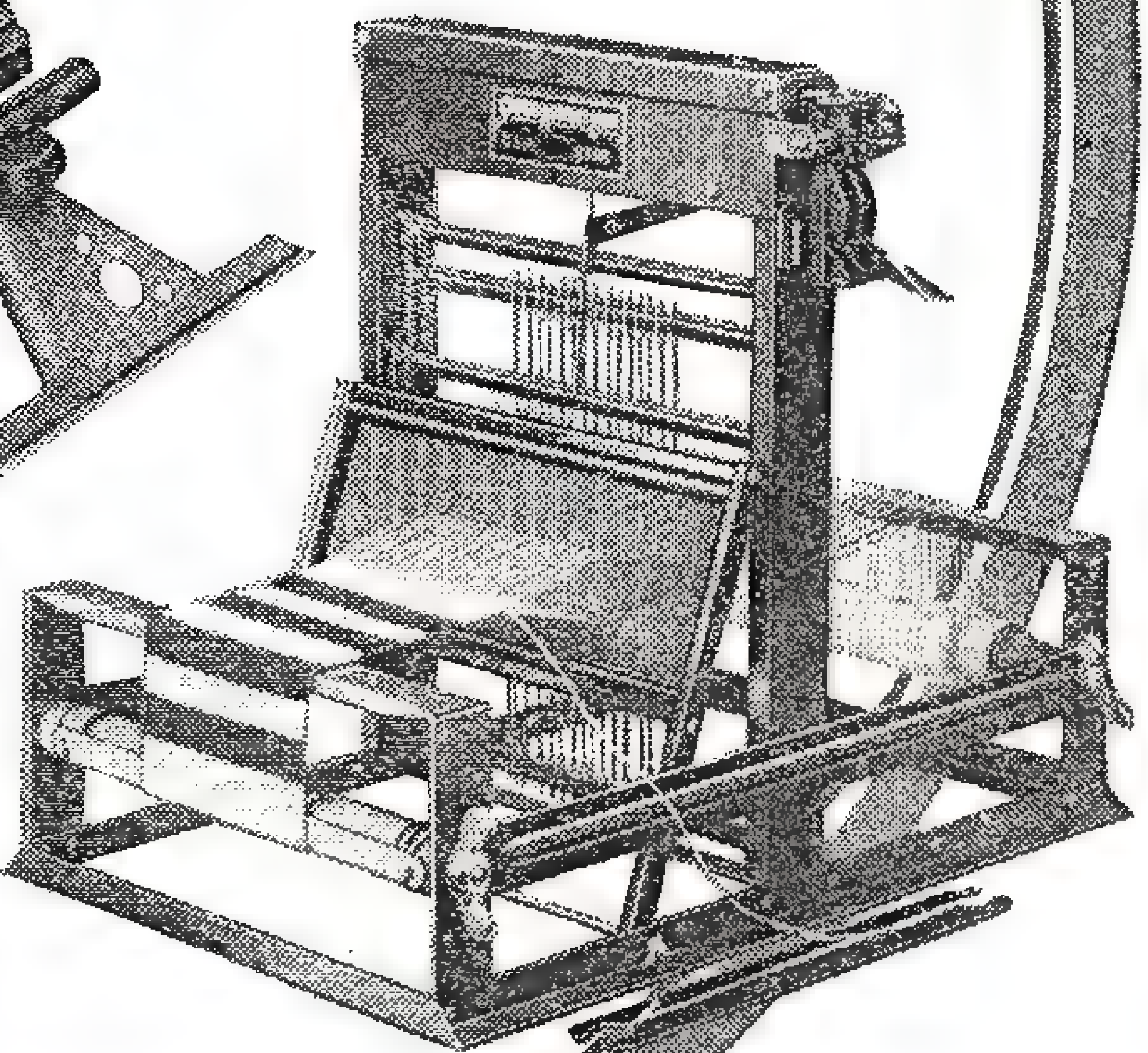
Coiled spring in shank causes key to shoot out of lock and back into the operator's hand. Studs coil spring or release it as key is inserted or withdrawn.

NEW TOYS *fill* Santa's Pack

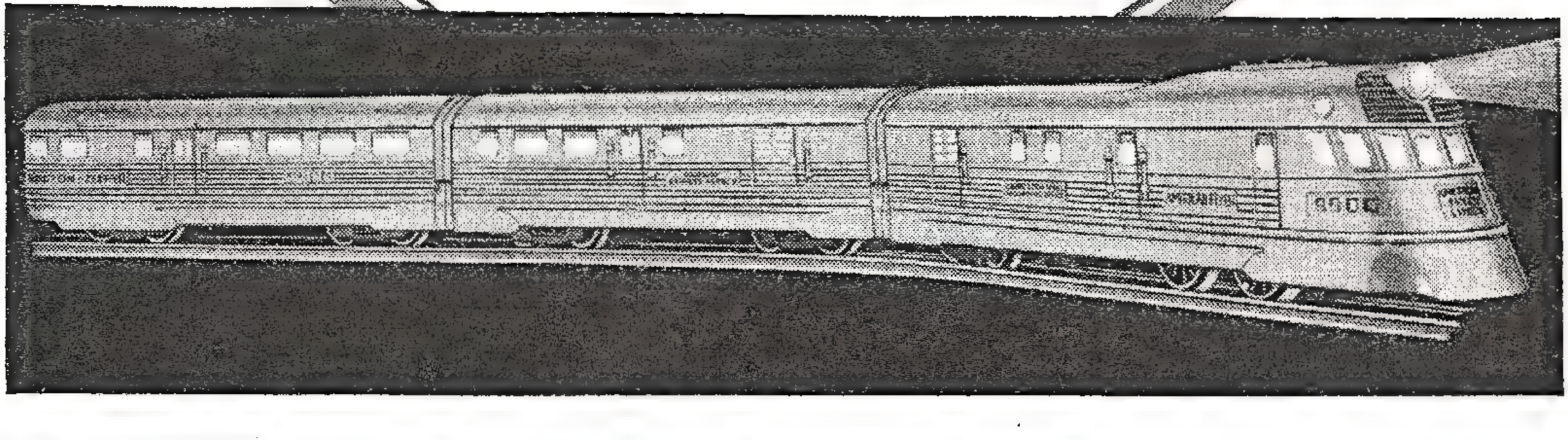


ALMOST HUMAN DOLL feeds from bottle, cooing happily as she sucks pure water through nipple. Take the bottle away and she'll start to cry. Bathe and powder her as you would a real baby—body is air and water-tight, even though arms, head, and legs are movable. Eyes remain closed when head is turned slightly.

TYPEWRITER priced below three dollars uses standard ribbon, has all characters found on large commercial machines.



SPEED SLED finished in gleaming chromium has third runner in center, attached to steering handle. So simple is new STEEL LOOM model at right that any child can make real rugs from colored yarns.



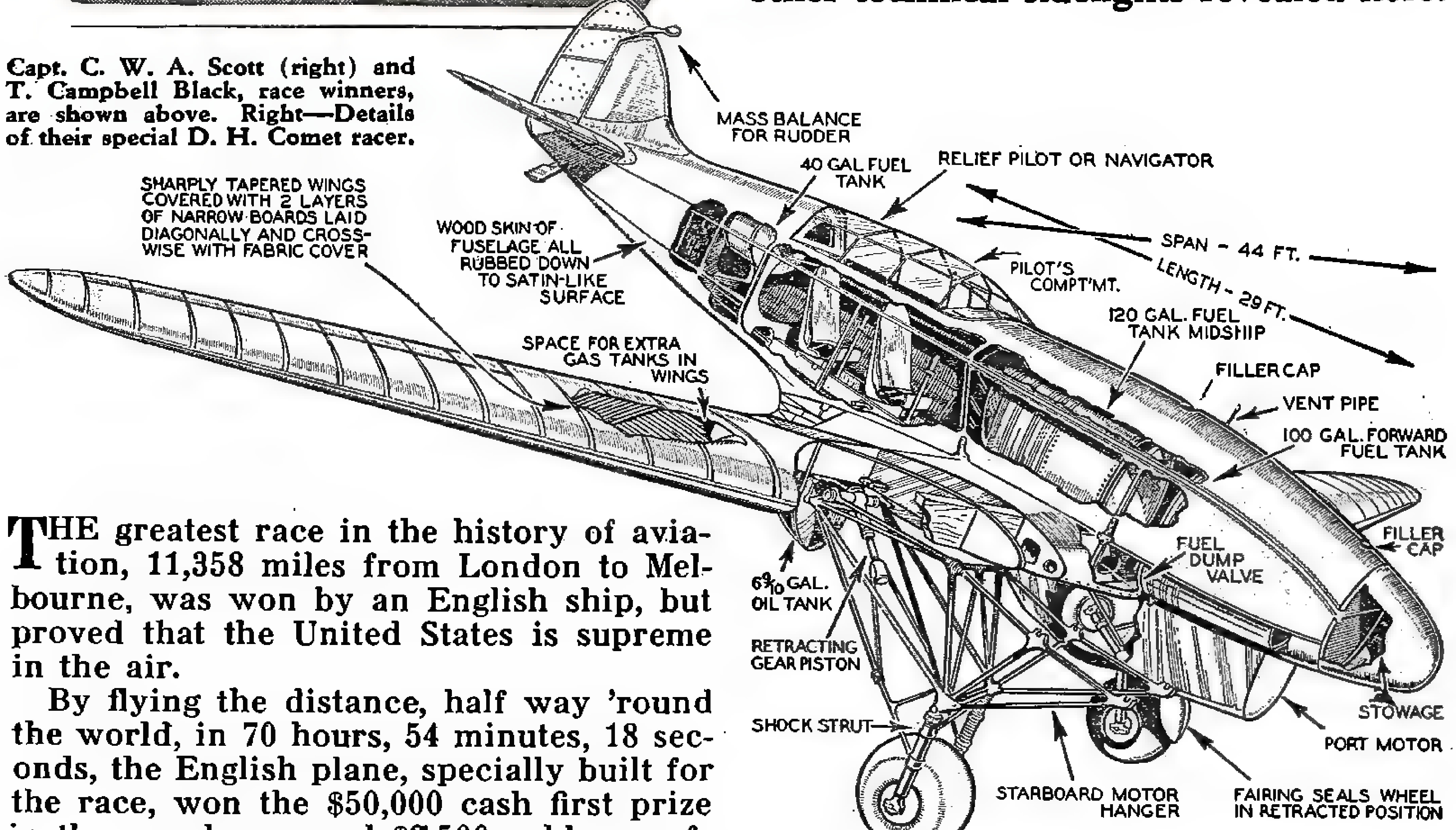
ZEPHYR STREAMLINE TRAIN model will operate over regular narrow gauge switches and track, turning in 33-inch radius circle. "Floating power" motor, truck, and car design makes possible scale model speed of 150 m.p.h. Three-unit train is 32 inches long; each car has flickerless lighting system. Entire train is finished in polished stainless steel. just as is "Burlington's" Zephyr. Train operates with standard transformer eliminating need for special control equipment.

How Special Built Plane

by JAMES DYSON

American transport ships eclipse speed victory of British racer in dash half way 'round the world. Radio movies and other technical sidelights revealed here.

Capt. C. W. A. Scott (right) and T. Campbell Black, race winners, are shown above. Right—Details of their special D. H. Comet racer.

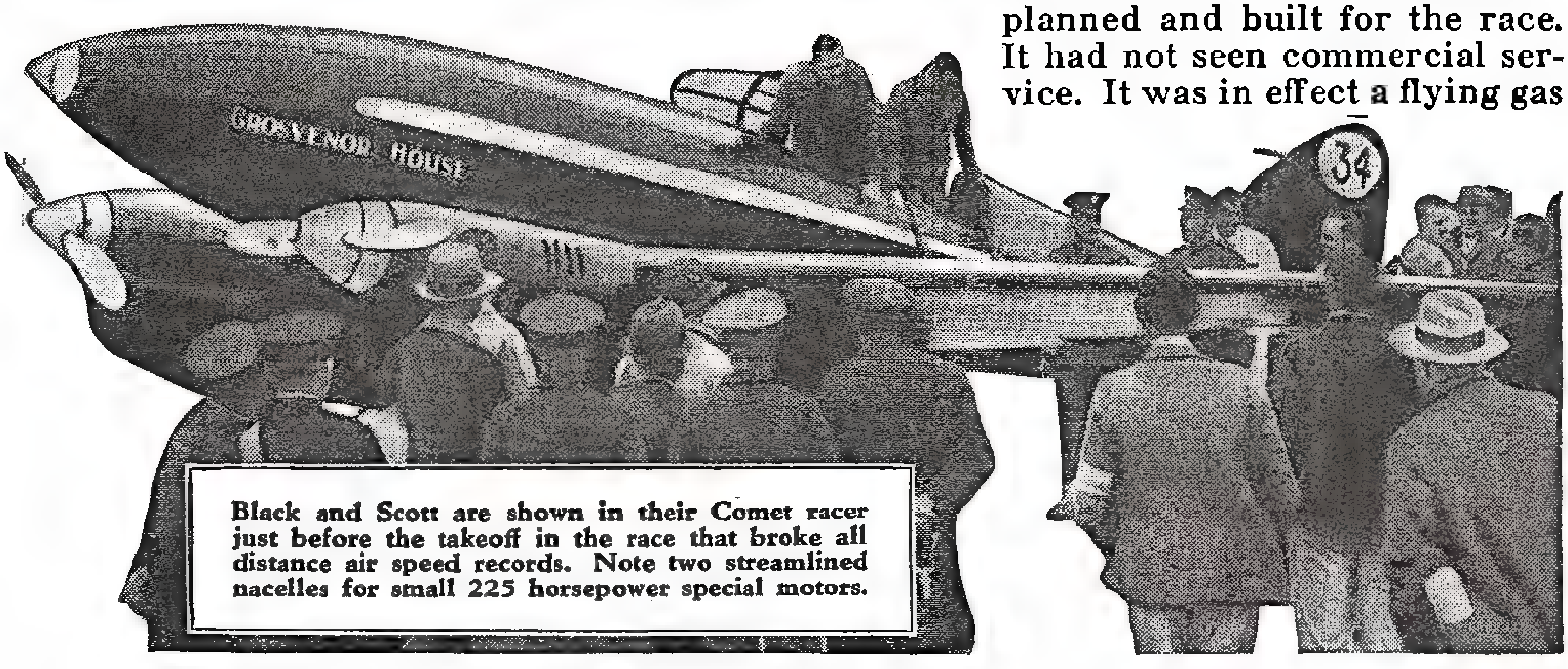

MASS BALANCE FOR RUDDER
40 GAL FUEL TANK
RELIEF PILOT OR NAVIGATOR
SHARPLY TAPERED WINGS COVERED WITH 2 LAYERS OF NARROW BOARDS LAID DIAGONALLY AND CROSS-WISE WITH FABRIC COVER
WOOD SKIN OF FUSELAGE ALL RUBBED DOWN TO SATIN-LIKE SURFACE
SPAN - 44 FT.
LENGTH - 29 FT.
PILOT'S COMPT'MT.
120 GAL. FUEL TANK MIDSHIP
SPACE FOR EXTRA GAS TANKS IN WINGS
FILLER CAP
VENT PIPE
100 GAL. FORWARD FUEL TANK
FILLER CAP
FUEL DUMP VALVE
6 9/10 GAL. OIL TANK
RETRACTING GEAR PISTON
SHOCK STRUT
STOWAGE
PORT MOTOR
STARBOARD MOTOR HANGER
FAIRING SEALS WHEEL IN RETRACTED POSITION

THE greatest race in the history of aviation, 11,358 miles from London to Melbourne, was won by an English ship, but proved that the United States is supreme in the air.

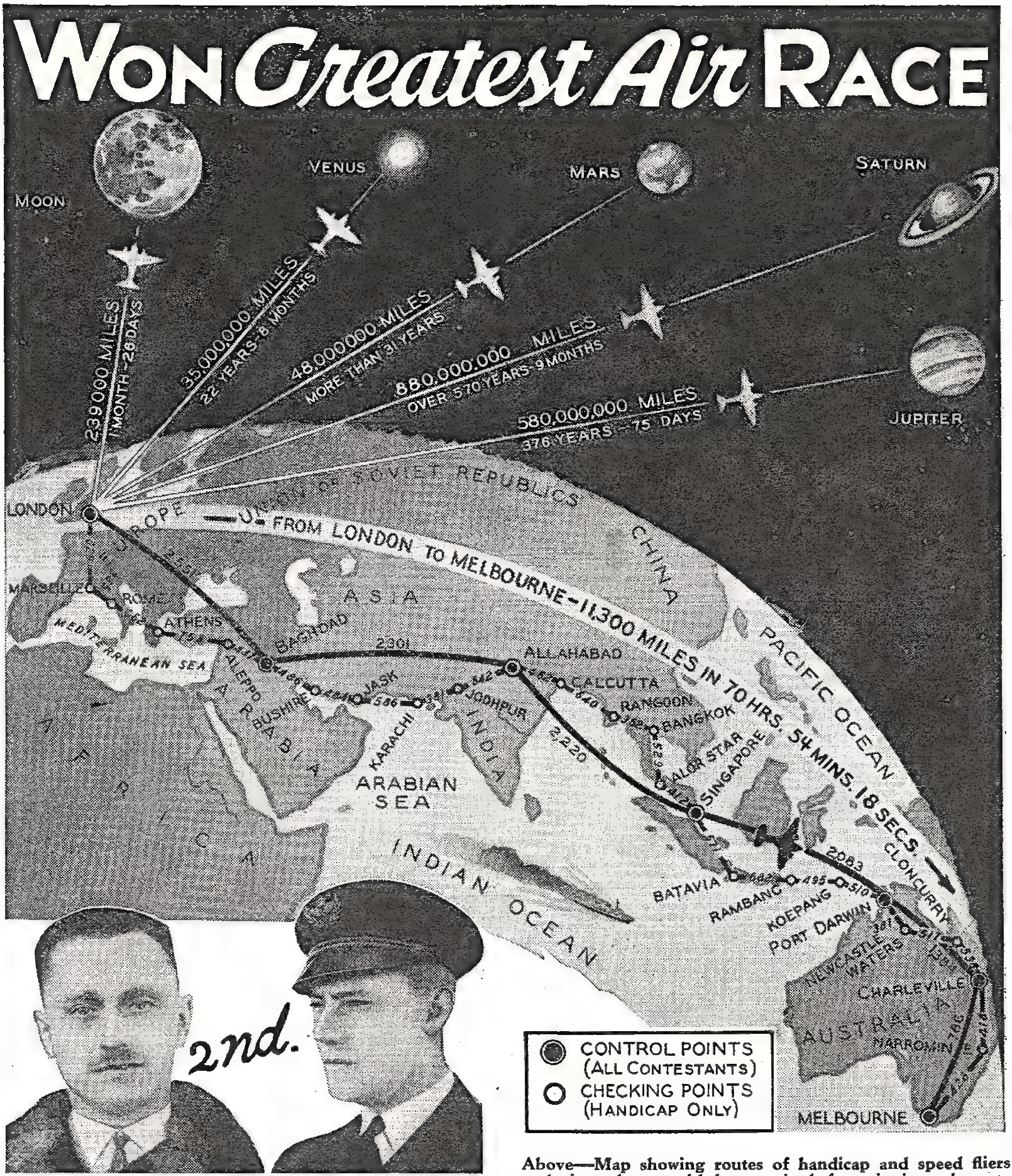
By flying the distance, half way 'round the world, in 70 hours, 54 minutes, 18 seconds, the English plane, specially built for the race, won the $50,000 cash first prize in the speed race and $2,500 gold cup offered by Sir MacPherson Robertson, Australian candy manufacturer. The astounding time, less than three days, cut by more than half the record of 6 days, 17 hours, 56 minutes established in 1933 by Charles J. P. Ulm.

This great speed, averaging 176 miles per hour in flying time, was eclipsed, however, by the feats of two American ships which arrived in second and third positions in Melbourne. Both were standard commercial airliners, similar to those used on the regular transport lines in the United States.

The British ship, on the other hand, was planned and built for the race. It had not seen commercial service. It was in effect a flying gas


GROSVENOR HOUSE
34

Black and Scott are shown in their Comet racer just before the takeoff in the race that broke all distance air speed records. Note two streamlined nacelles for small 225 horsepower special motors.


WON Greatest Air RACE
MOON
VENUS
MARS
SATURN
JUPITER
239,000 MILES 1 MONTH-28 DAYS
35,000,000 MILES 22 YEARS-8 MONTHS
48,000,000 MILES MORE THAN 31 YEARS
880,000,000 MILES OVER 570 YEARS-9 MONTHS
580,000,000 MILES 376 YEARS-75 DAYS
LONDON
EUROPE
UNION OF SOVIET REPUBLICS
FROM LONDON TO MELBOURNE-11,300 MILES IN 70 HRS. 54 MINS. 18 SECS.
CHINA
PACIFIC OCEAN
ASIA
MARSEILLES
ROME
ATHENS
MEDITERRANEAN SEA
ALEPPO
BAGHDAD
2301
ALLAHABAD
CALCUTTA
RANGOON
BANGKOK
ALOR STAR
SINGAPORE
BUSHIRE
JASK
KARACHI
JODHPUR
INDIA
ARABIA
AFRICA
ARABIAN SEA
INDIAN OCEAN
2220
2083
BATAVIA
RAMBANG
KOEPANG
PORT DARWIN
NEWCASTLE WATERS
CLONCURRY
CHARLEVILLE
NARROMINE
AUSTRALIA
MELBOURNE
CONTROL POINTS (ALL CONTESTANTS)
CHECKING POINTS (HANDICAP ONLY)
2nd.

Above—Map showing routes of handicap and speed fliers and time that would be required for winning plane to reach planets and the moon. Left—J. J. Moll (left) and K. D. Parmentier, Dutch fliers, who turned in the outstanding performance of the race with a stock Douglas.

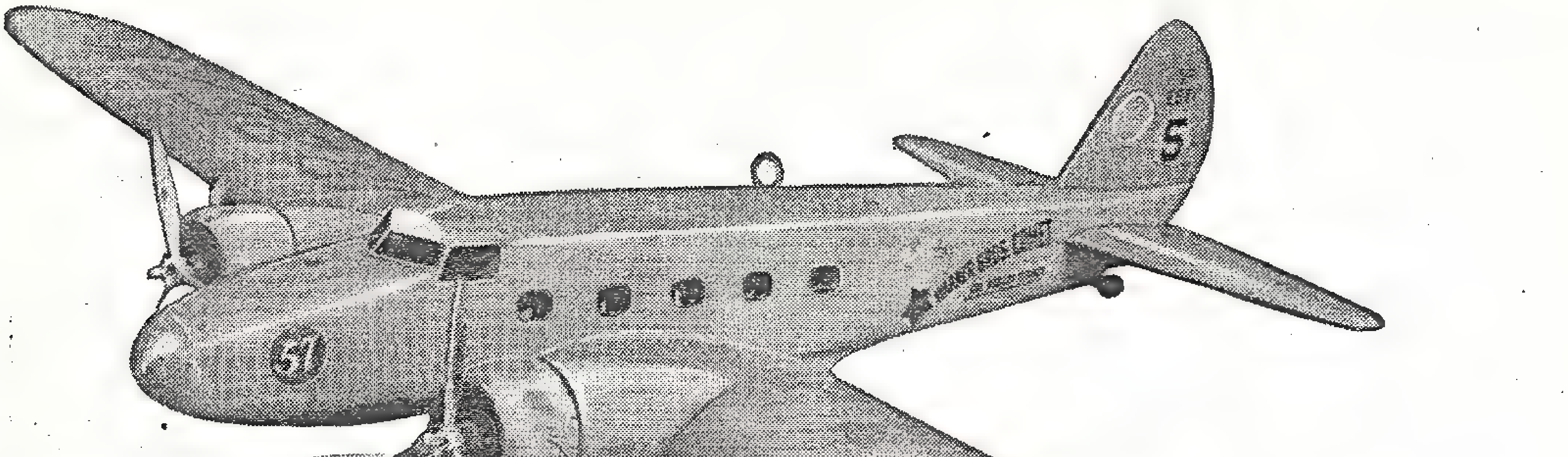
tank intended for racing. Eventually it probably will be put into commercial service, but before that can be accomplished it will have to be modified to provide room for passengers and cargo.

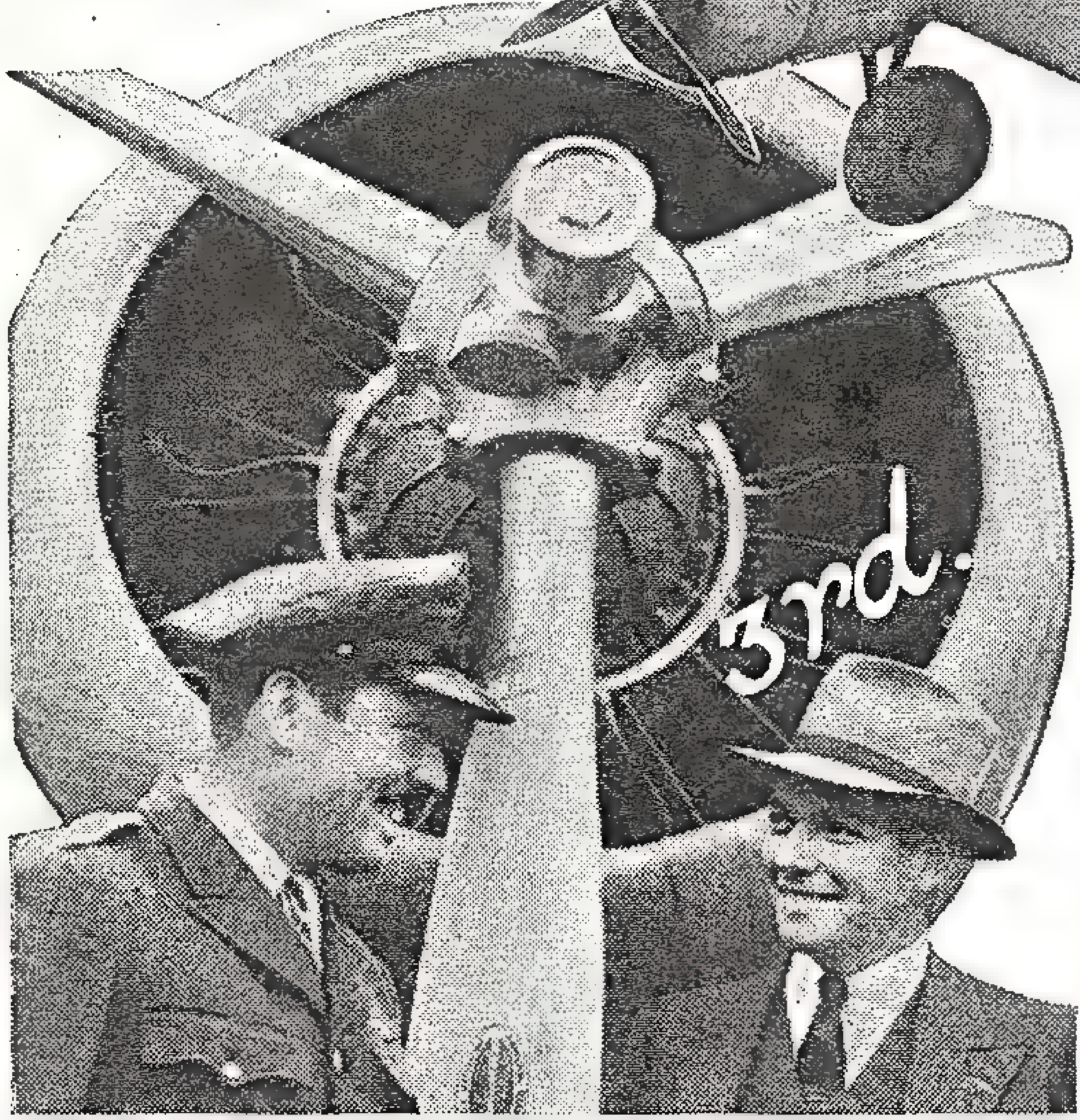
Of the two American ships in the prize money the outstanding performance was accomplished by a standard Douglas DC 2 airliner flown by the Dutch team of K. D. Parmentier and J. J. Moll. It was the second ship to reach Melbourne, its handicap time being 3 days, 4 hours, 38 min. It outshone the winning D. H. Comet, by flying approximately 1,000 more miles by stopping at every checking point on the route and by carrying six persons, to the British plane's two, a cargo of mail, baggage, and food for passengers and crew.

The second American ship to press the British racer was a Boeing 247D transport plane flown by the noted fliers, Capt. Roscoe Turner and Clyde Pangborn. They landed in Melbourne just three hours after the Dutch team. Their total time from London to the Australian city was 3 days, 20 hours, 55 minutes.

The greatest scientific sidelight of the race was the transmission by radio of news-

United States Airliner, Carrying Passengers, Mail, Surprises Air Experts





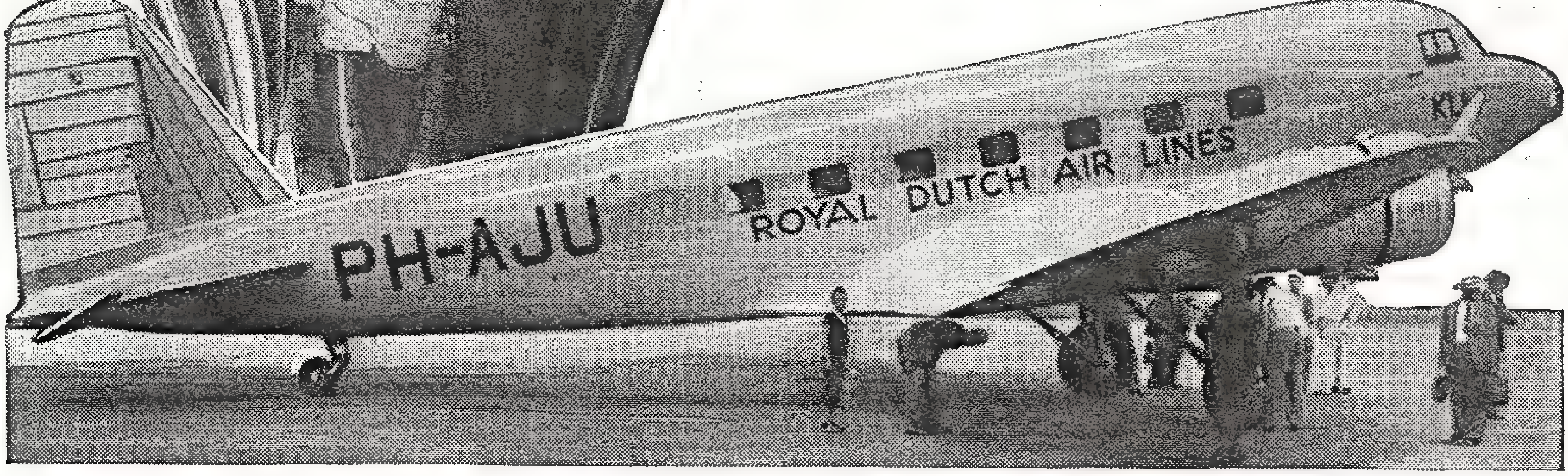
Above—Turner's Boeing ship. Left—Roscoe Turner and Clyde Pangborn, U. S. team that placed third in the race.

reel movies of the finish from Melbourne to London. Two days after Scott and Black arrived in Melbourne, London movie patrons saw them on the screen. The movies were transmitted by enlarging each frame of the newsreel in Melbourne. Each enlarged photo was transmitted by radio to London, where it was reduced and transferred to its proper place on a movie film.

The race was run in two sections, a speed race and a handicap race. All time in the air or on the ground was counted against fliers in the speed race. They had to stop at only five control points averaging about 2,000 miles apart. Planes in the handicap race had to stop at these control points, but in addition could stop at 17 checking points, averaging about 500 miles apart, without losing time in the race. Only time spent between these cities was counted against the fliers.

When the Dutch team flying the American Douglas announced that they were entering the race not merely for the prize, but to

(Continued on page 142)



This American built Douglas airliner astounded air experts by placing second in speed race even though it carried passengers and mail. Above—Turner inspecting special tanks in his Boeing for more than 1,000 gallons of gas.

Plans Submarine Cargo Route England to Japan

SIMON LAKE, "father" of the modern submarine, recently startled shipping interests with plans for a proposed line of cargo-carrying submarines to be routed over the top of the world, England to Japan, via the Arctic and Pacific oceans.

According to Mr. Lake, the proposed route is expected to cut in half the present cargo schedules of surface ships by the expedient of finding a channel beneath the masses of Arctic ice.

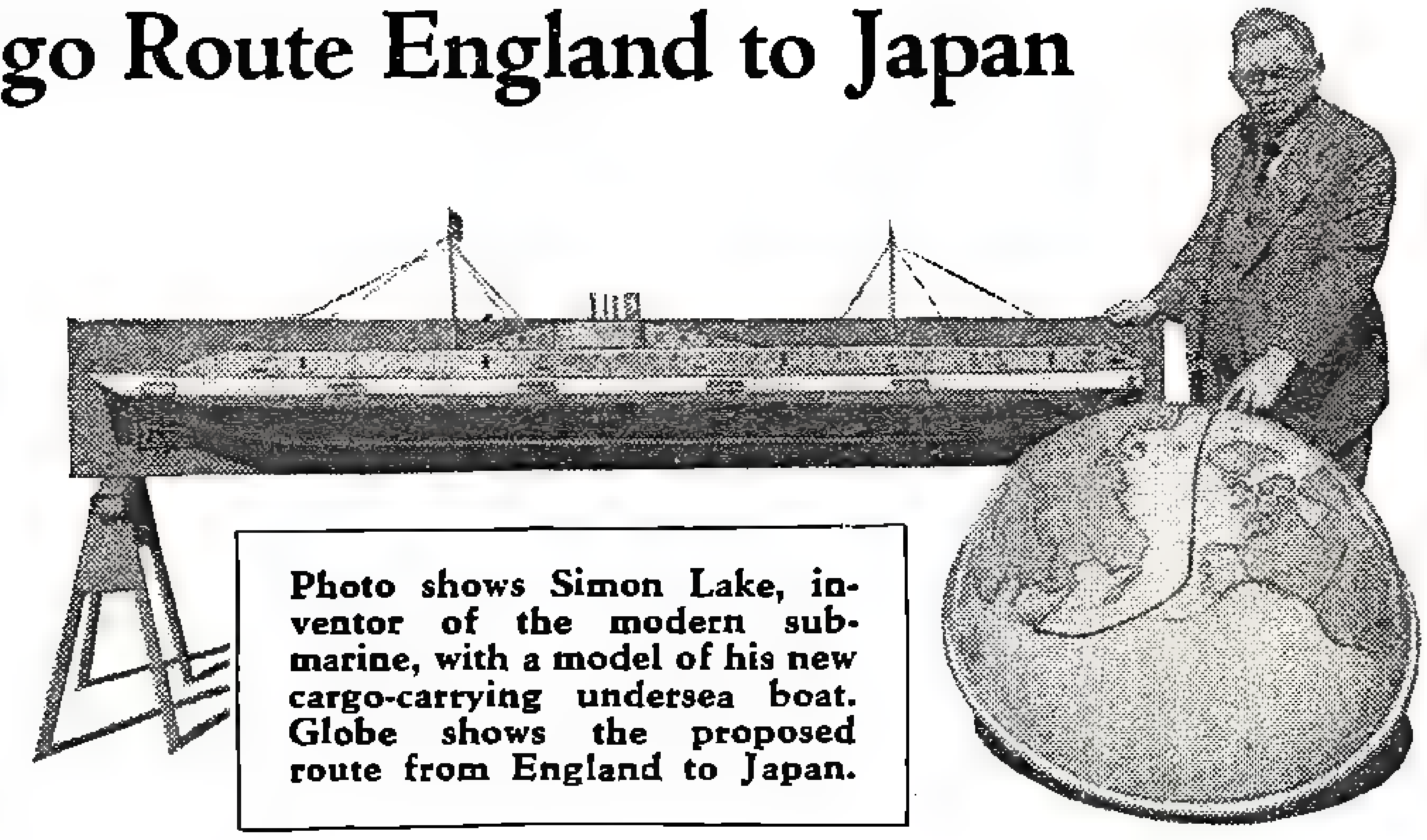
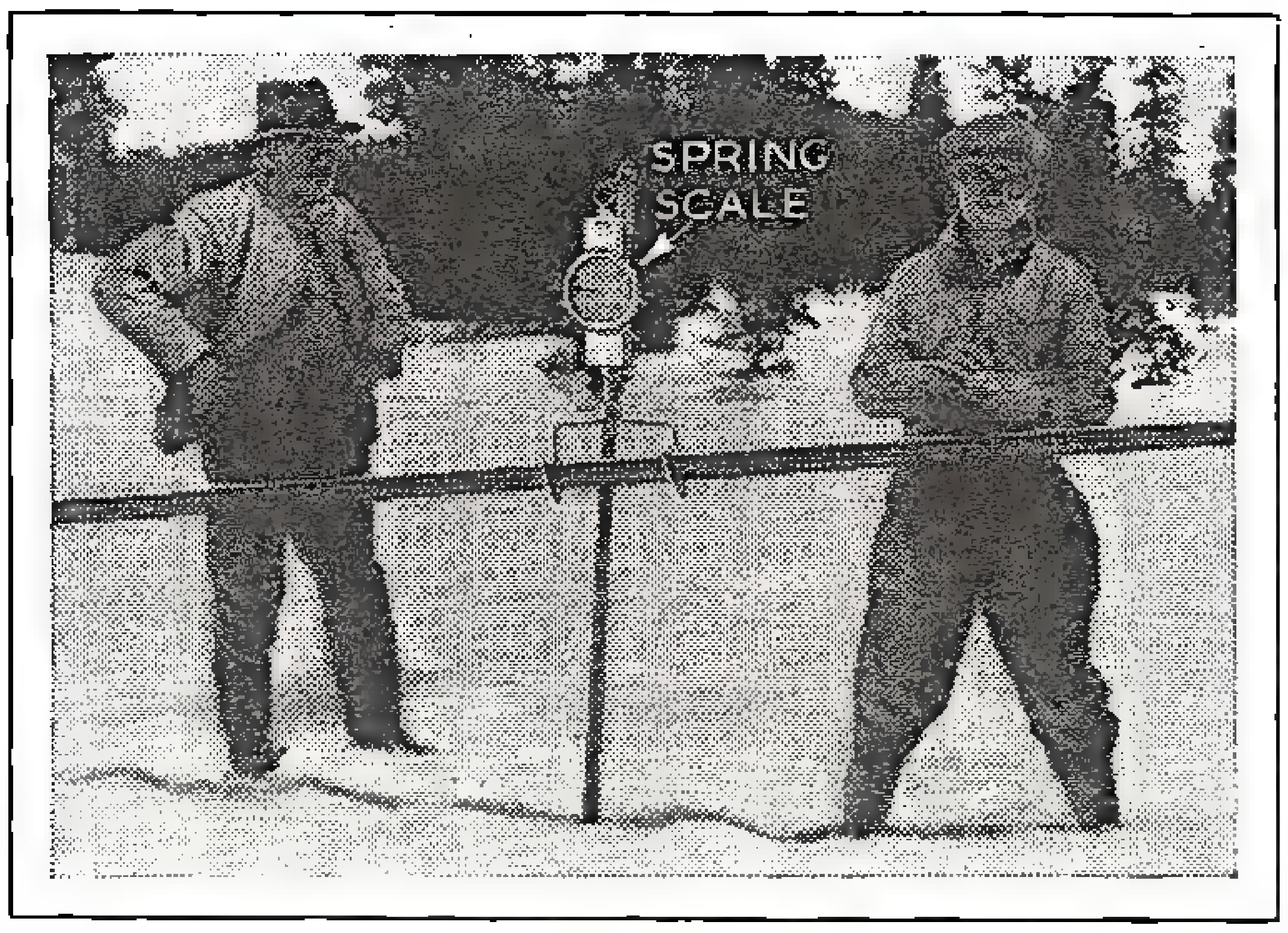


Photo shows Simon Lake, inventor of the modern submarine, with a model of his new cargo-carrying undersea boat. Globe shows the proposed route from England to Japan.

Mr. Lake has already passed the purely speculative stage in his plans with the construction of a model from which he expects to build a 400-foot, 13,000-ton craft. Provisions for navigating under ice have been made by installing collapsible stacks, mast and periscope on the model submersible.

Snow Samples Show Water Content



Sample tubes are shoved into snowbank to secure a core of snow which is weighed and measured to determine the amount of water content in an entire mountain snowfield.

THROUGH the work of scientists who weigh and analyze snow samples, western farmers dependent upon mountain snow packs for irrigation may know in the winter months just how much water they can expect in their reservoirs during the coming summer.

The tests are made at high altitudes where the ice fields are slow to melt. Sample tubes are pushed into the snow to secure a core which is carefully weighed. By determining the ratio between the height of the sample and its weight the water content of an entire snow field may be estimated.

Thus, if the snow is fluffy and has a correspondingly low water content, ranchers may be prepared to face serious water shortages or rapid melting resulting in floods. Solidly packed snow, on the other hand, melts slowly and assures a steady flow of water to the storage reservoirs.

Pilot Sets Record of 440 M.P.H.

HURLING his "flying engine" through the skies at the incredible speed of 440.6 m.p.h., Lieut. Francesco Agello, senior pilot of Mussolini's High Speed Flying School, recently broke his own world's record to hang up the fastest time ever made by man.

Agello's record was made on a 3-kilometer course over Lake Garda in northern Italy, site of the school whose members have set as their goal a speed of 600 m.p.h.

Known as the *Red Bullet,* Agello's ship is a specially built Macchi seaplane, powered by a 3500 h.p. Fiat motor. Only 161 square feet of wing surface support its 3-ton weight, a wing-load twice that of commercial planes. The ship lands at 130 m.p.h.

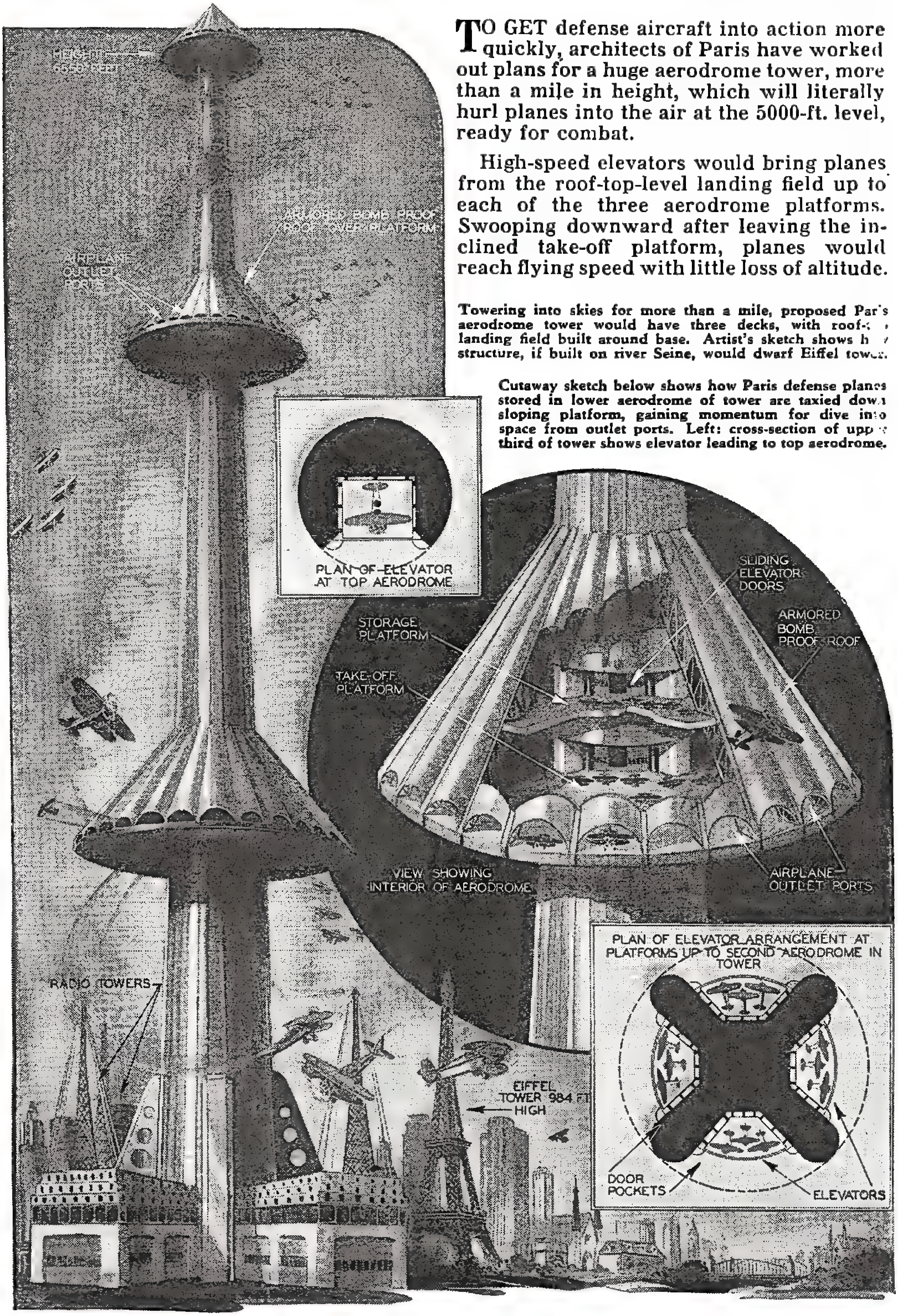
This speed makes the plane one of the most difficult in the world to land.

Lieut. Francesco Agello, Italian ace, standing beside the Macchi-Fiat in which he set a new world's speed record.

Giant Air TOWER to GUARD PARIS

TO GET defense aircraft into action more quickly, architects of Paris have worked out plans for a huge aerodrome tower, more than a mile in height, which will literally hurl planes into the air at the 5000-ft. level, ready for combat.

High-speed elevators would bring planes from the roof-top-level landing field up to each of the three aerodrome platforms. Swooping downward after leaving the inclined take-off platform, planes would reach flying speed with little loss of altitude.


HEIGHT 6560 FEET
ARMORED BOMB PROOF ROOF OVER PLATFORM
AIRPLANE OUTLET PORTS
PLAN OF ELEVATOR AT TOP AERODROME
STORAGE PLATFORM
TAKE-OFF PLATFORM
SLIDING ELEVATOR DOORS
ARMORED BOMB PROOF ROOF
VIEW SHOWING INTERIOR OF AERODROME
AIRPLANE OUTLET PORTS
PLAN OF ELEVATOR ARRANGEMENT AT PLATFORMS UP TO SECOND AERODROME IN TOWER
DOOR POCKETS
ELEVATORS
RADIO TOWERS
EIFFEL TOWER 984 FT HIGH

Towering into skies for more than a mile, proposed Paris aerodrome tower would have three decks, with roof-top landing field built around base. Artist's sketch shows how structure, if built on river Seine, would dwarf Eiffel tower.

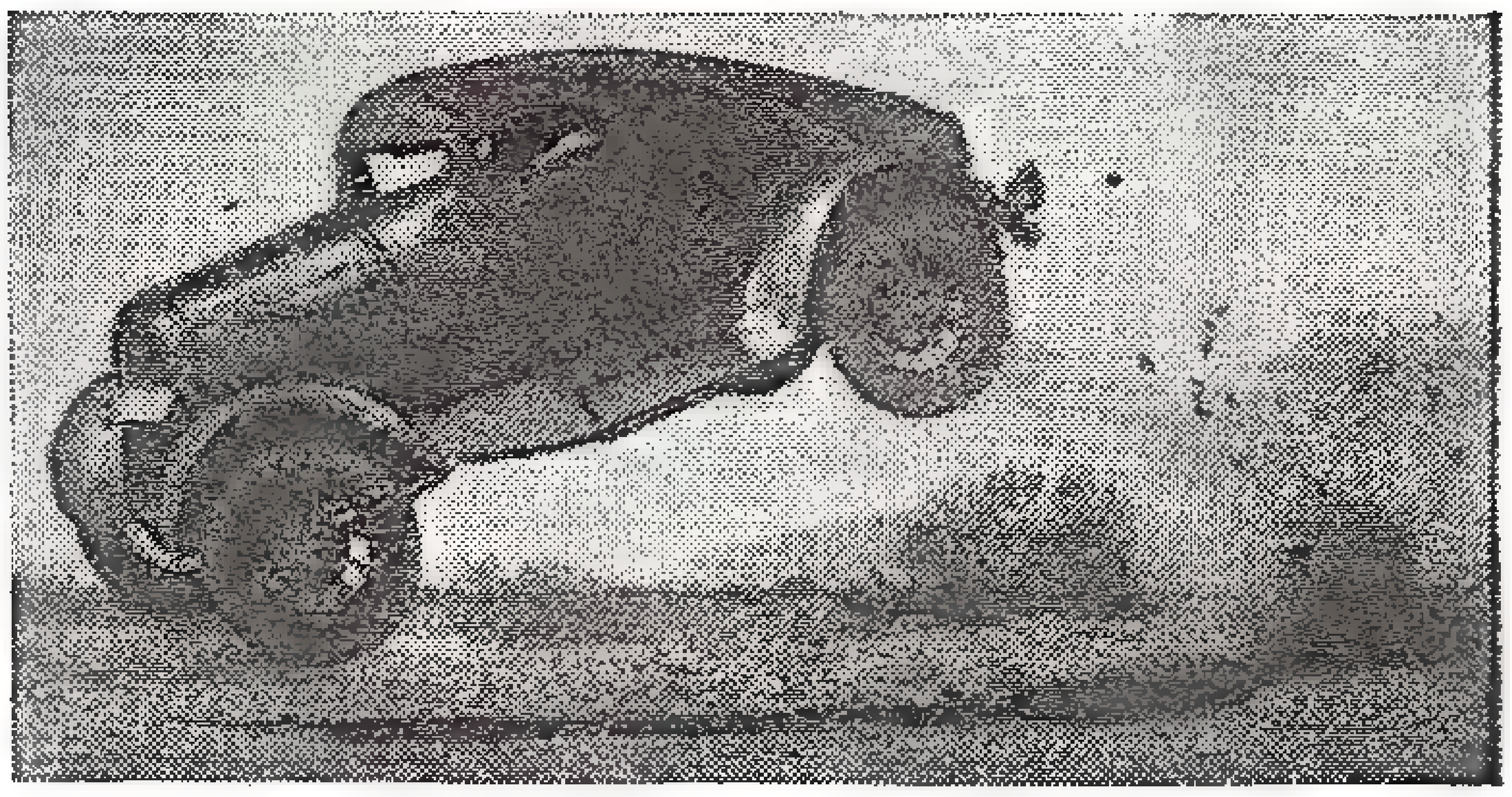
Cutaway sketch below shows how Paris defense planes stored in lower aerodrome of tower are taxied down sloping platform, gaining momentum for dive into space from outlet ports. Left: cross-section of upper third of tower shows elevator leading to top aerodrome.

California Mechanic Constructs Virtually Foolproof Auto

SUCCESSFULLY passing a series of rigorous tests, a new "foolproof" car developed by a California mechanic may mark a new era in the automobile industry.

A low center of gravity, even weight distribution and specially built springs give the car amazing stability. Driven at a speed of 60 miles an hour over a three foot bank, the car jumped nearly 52 feet yet remained upright. In another test the machine was driven backward at 50 miles an hour and thrown into a sharp U turn without overturning. It is said that the car must be tipped at an angle of more than 50 degrees to turn it over.

Built of metal, the coupe body may be lifted by one man; yet a 2-ton weight may be dropped on it from a height of 10 feet without incurring serious damage.



Hitting a three-foot bank at 60 miles an hour, the foolproof car jumped nearly 52 feet but remained right side up.

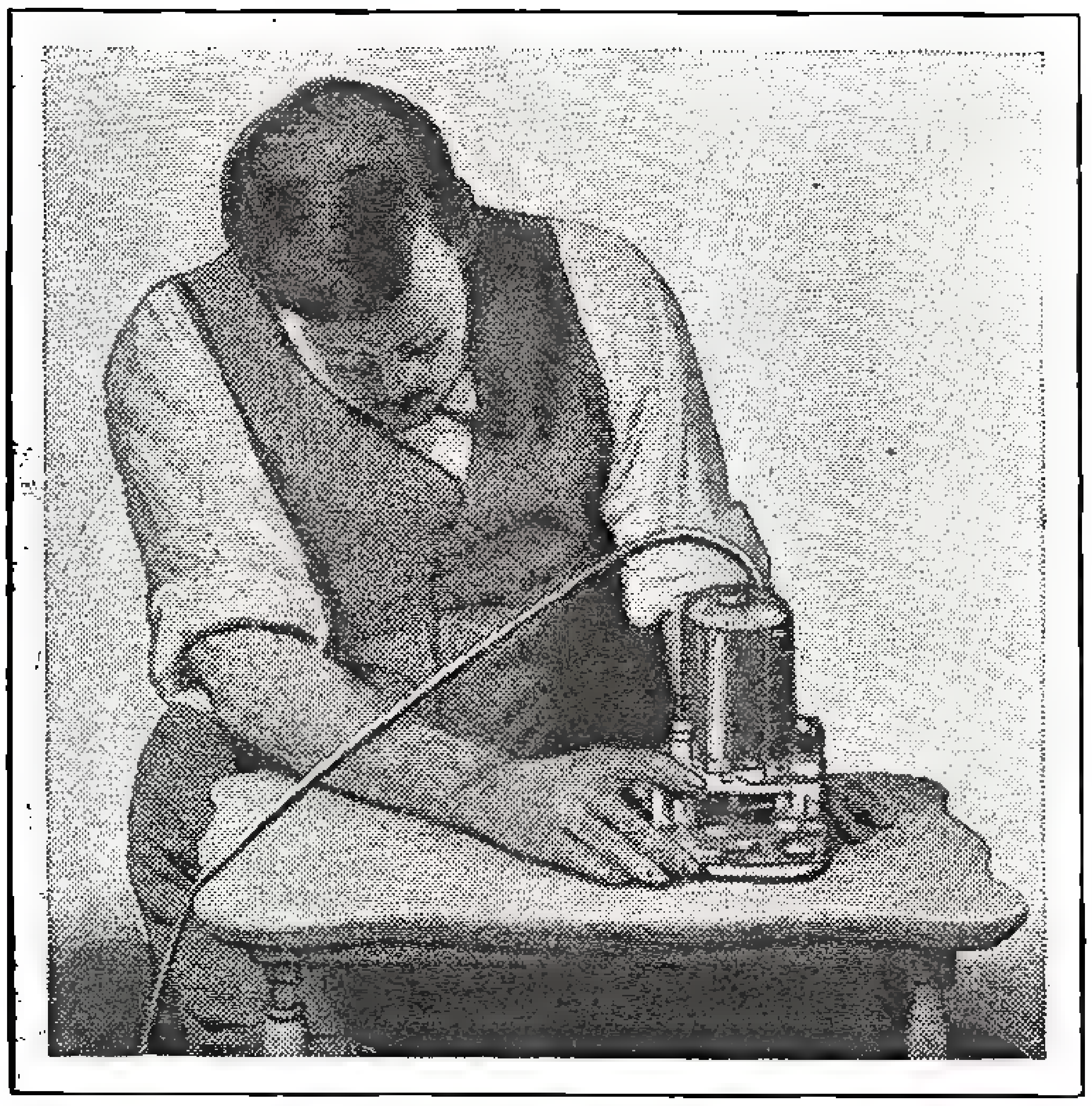


Photo shows portable router in use. Note compactness of unit and finger grip which affords complete control of tool.

Portable Router Aids Shop Work

COMBINING light weight with speed, a new portable router is said to be an invaluable aid to the shop worker.

Weighing only four pounds, the router is driven at high speed and embodies many unique features. The depth of the cut, for instance, is quickly and easily regulated by a thumb screw. A convenient finger grip affords complete control of the tool.

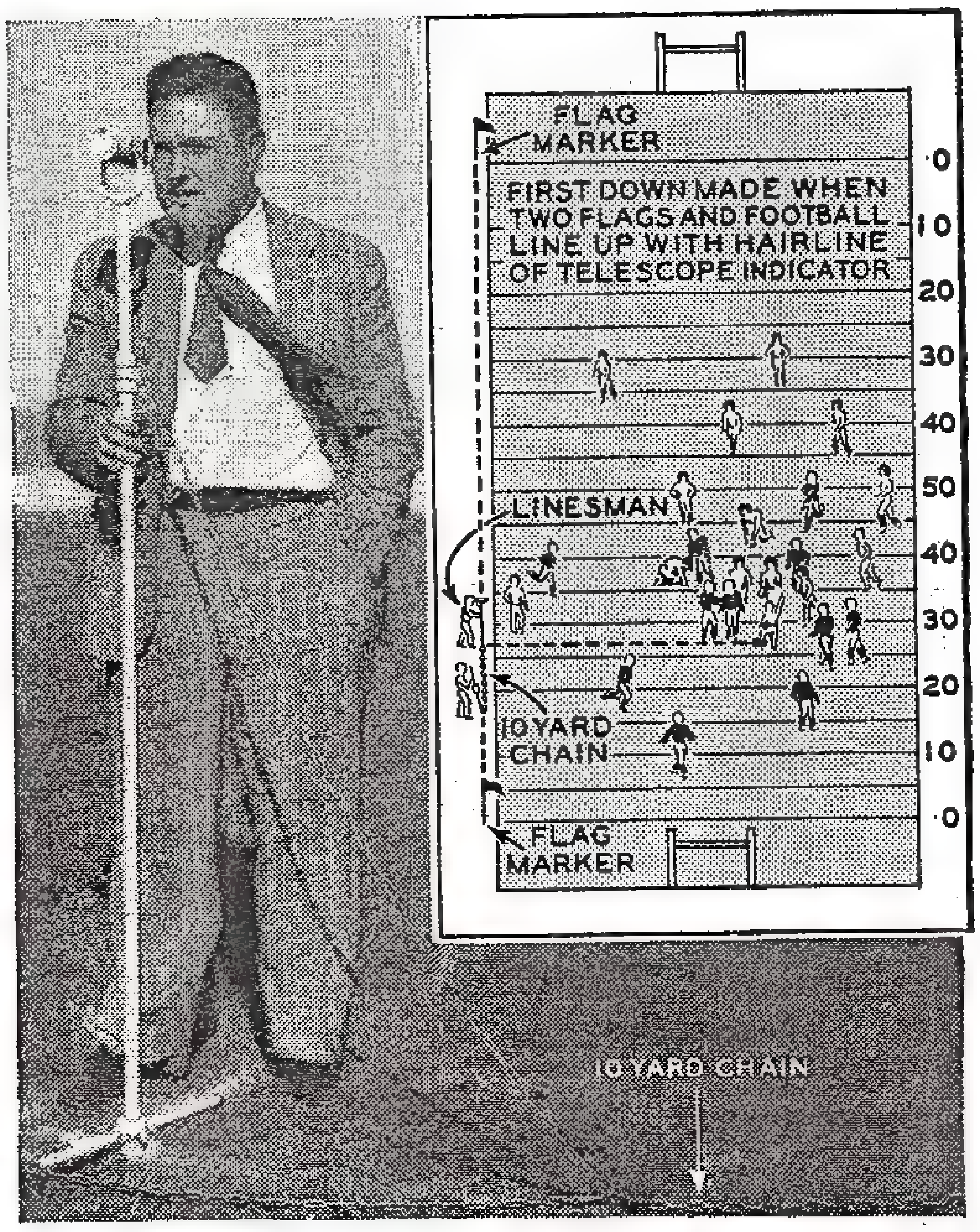
No expensive or elaborate attachments are needed for the router, which is capable of performing a number of varied tasks around the shop. In actual tests the machine has successfully performed operations such as routing, grooving, rabbeting and template routing. Inlaying, molding cuts, shaping, dove-tailing and carving are all said to be possible with the machine.

Grid Star Invents Downs Marker

INVENTED by Stan Borleske, former stellar end at Michigan (1909-10), a new linesman's indicator takes the guesswork out of the job of measuring football yardage.

The device embodies the principle of visual triangulation employed by surveyors. Two poles are connected by a 10-foot chain. One of the poles has a sighting tube which simultaneously reflects both the position of the ball and two flags placed on the sidelines at opposite ends of the field.

By centering the hairline sight on the ball and securing the proper focus on the equidistant flags, the linesman can instantly determine the 10-yard point and tell whether or not a first down has been made.


FLAG MARKER
FIRST DOWN MADE WHEN TWO FLAGS AND FOOTBALL LINE UP WITH HAIRLINE OF TELESCOPE INDICATOR
0
10
20
30
40
50
40
30
20
10
0
LINESMAN
10 YARD CHAIN
FLAG MARKER
10 YARD CHAIN

By lining up ball with flags on sidelines at opposite ends of football field, linesman can quickly measure yardage.

Win CASH for Furniture

Here's your chance to win one of 56 prizes, totaling $500.00 in cash. This is the second of four big contests for home improvements for MM readers.

At right is a battered old fashioned chair that was converted into the modern occasional chair shown in circle on next page. Photo above shows upholstering being tacked in place on arm of chair. Seat is ready for cotton batting.

Do you enjoy rebuilding second hand furniture or do you prefer to work out your own designs for tables, chairs, floor lamps and other articles for the home? In either case you have a chance to win one of 14 prizes totaling $125.00 in this contest, the second of four offering $500.00 in cash.

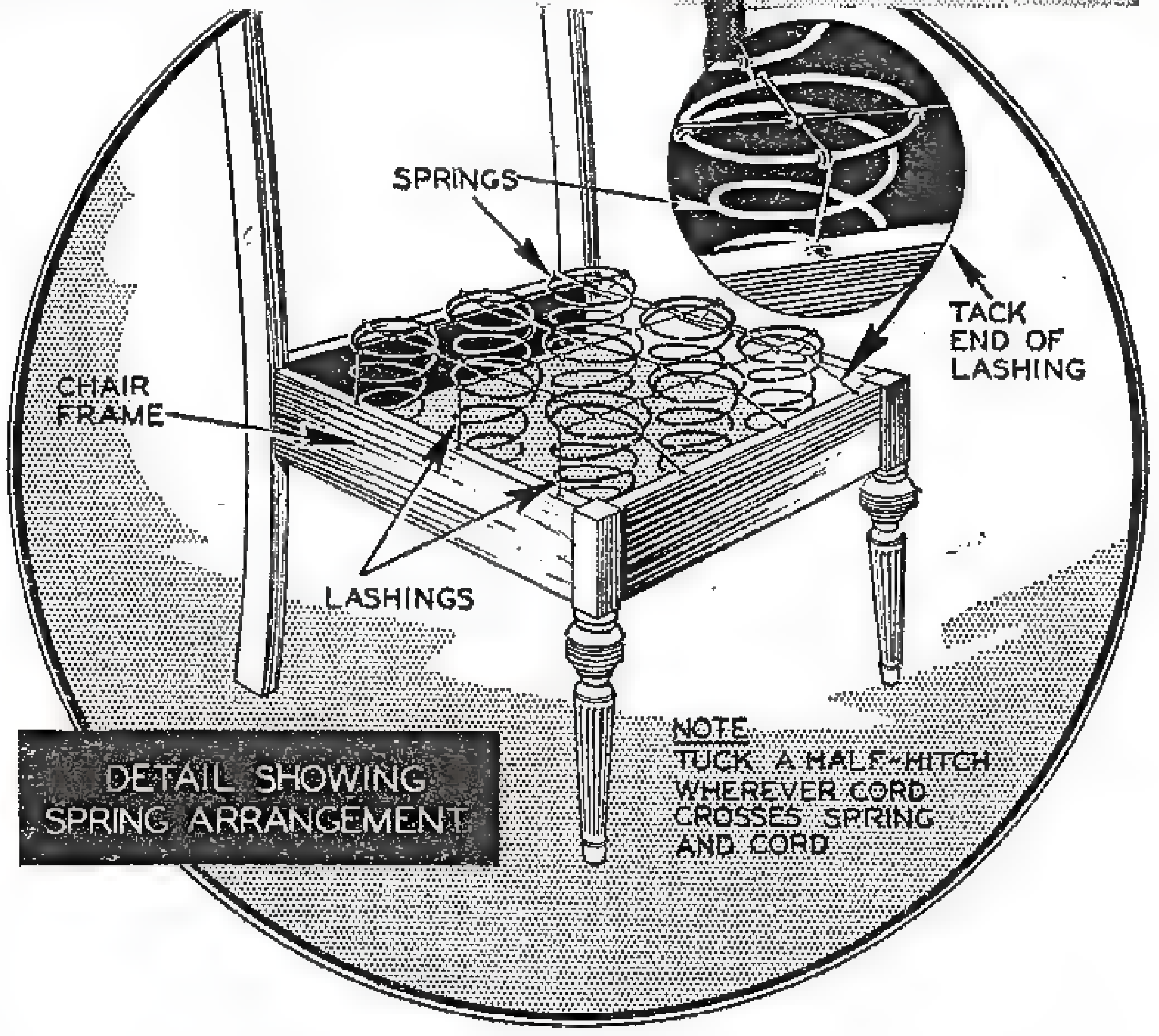
This month the prizes are offered for the best ideas from readers on rebuilding or designing furniture. Many of you have converted old radio cabinets into beautiful chests, second hand rocking chairs into porch swings, and old-fashioned furniture into more modern pieces. Others have designed furniture along modernistic, colonial, mission or other period lines.

To enter this contest all you have to do is tell as briefly as possible how to build or rebuild any article of furniture for the home. Read the rules and list of prizes on the next page and then send in your entry. The following article will show you one way to prepare your entry.

by J. JULIUS FANTA

RE-UPHOLSTERING a set of old furniture has various distinct advantages one should not pass up when making household changes this winter. If you are tired of your present set, you can acquire at low cost a suite of castaway chairs. Under the dust-covered, shredded pieces of grandmother's day are just the "makings" of a set now in vogue.

Should your present set be on its last legs, look for one that's still solid in structure, with sound joints. The condition of the upholstering does not matter since we must re-upholster to bring the chairs up to date.

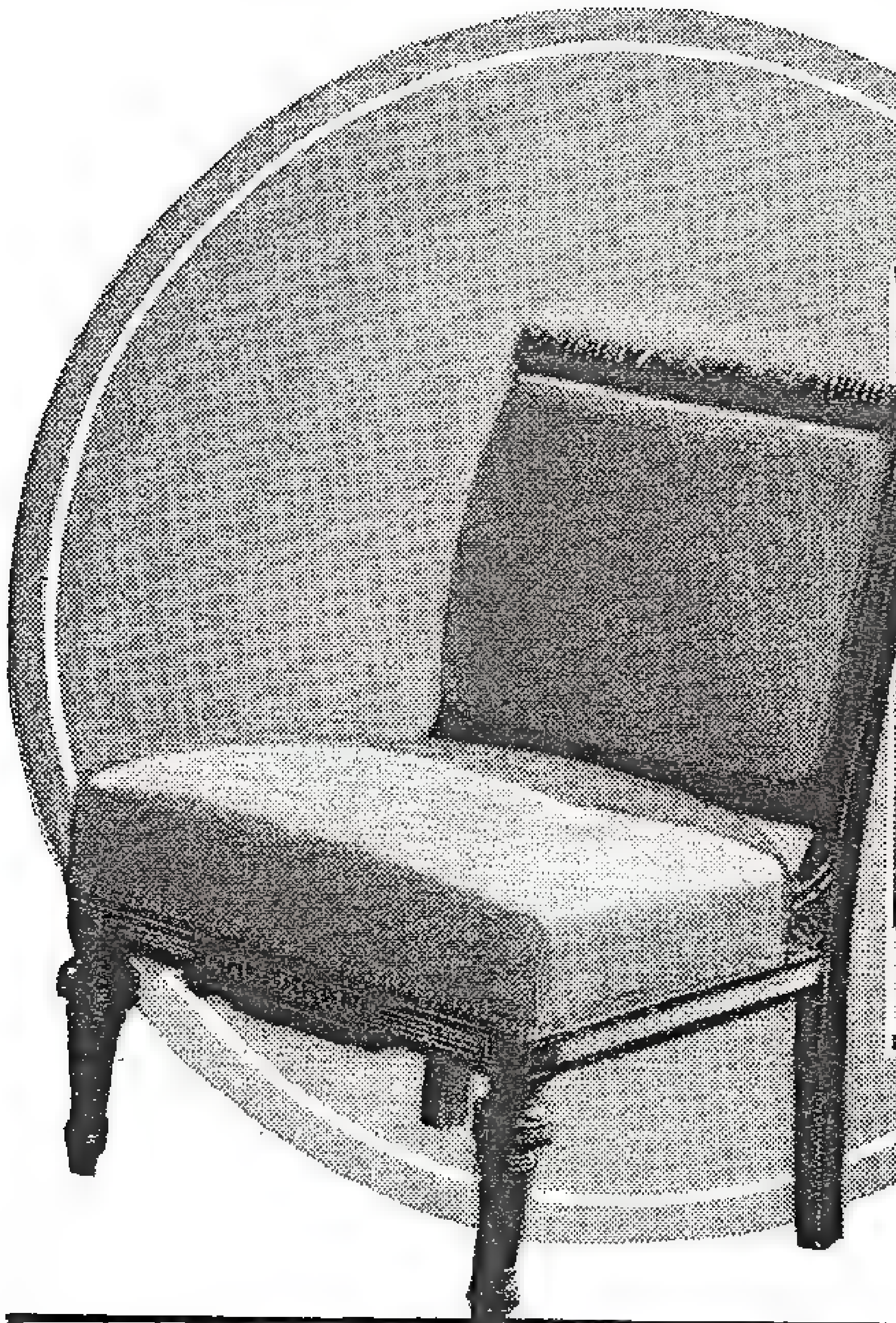

SPRINGS
TACK END OF LASHING
CHAIR FRAME
LASHINGS
DETAIL SHOWING SPRING ARRANGEMENT
NOTE: TUCK A HALF-HITCH WHEREVER CORD CROSSES SPRING AND CORD

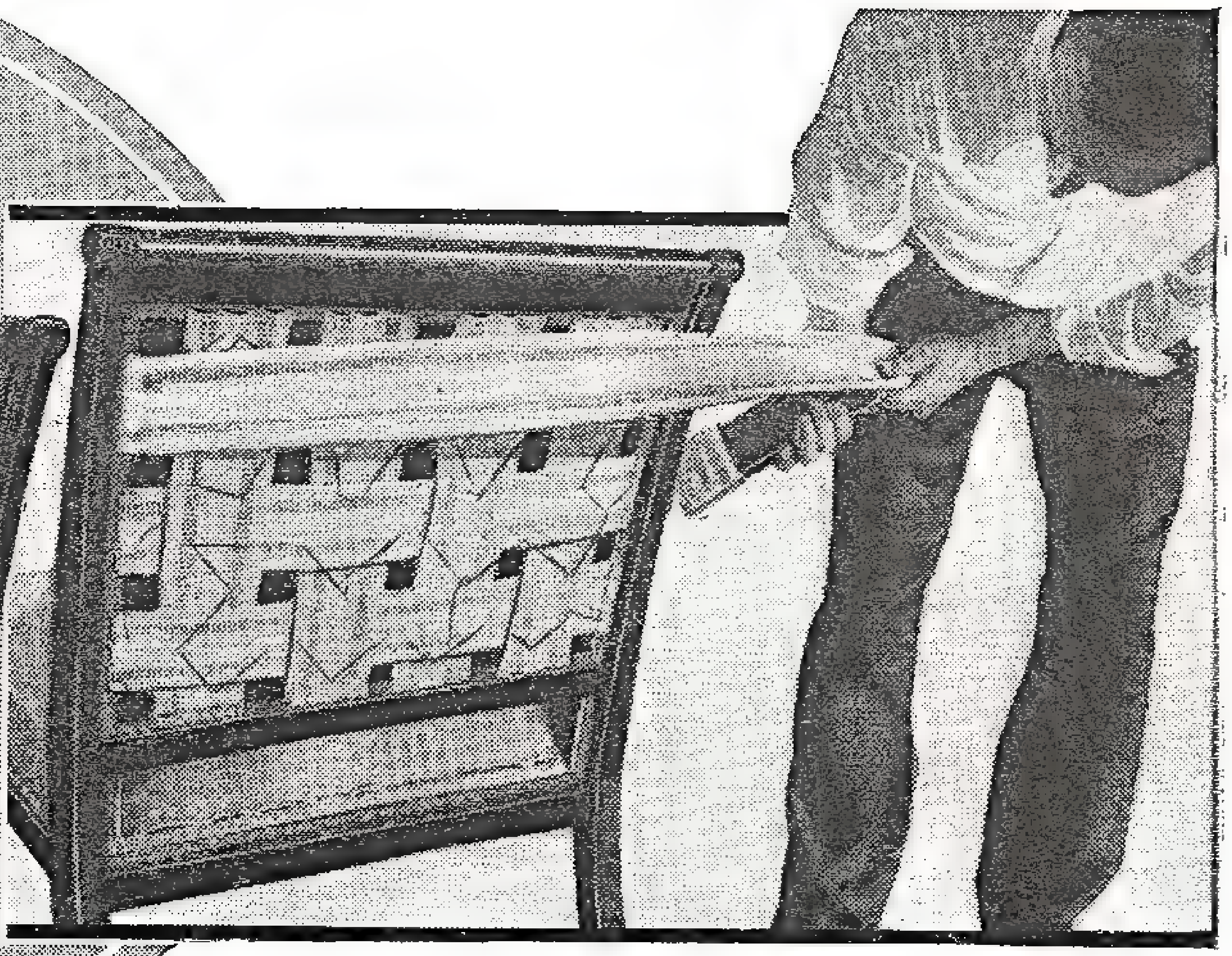
All old upholstering is removed. The tops of the springs are spaced evenly and held in place with cord as shown.

In buying material figure about 2½ yards of 54″ tapestry for two small chairs. For a two-person settee you'll need three yards of the same material. Three yards of 4″ webbing are required to support the springs of a small chair. Larger pieces should be measured for the exact amount,

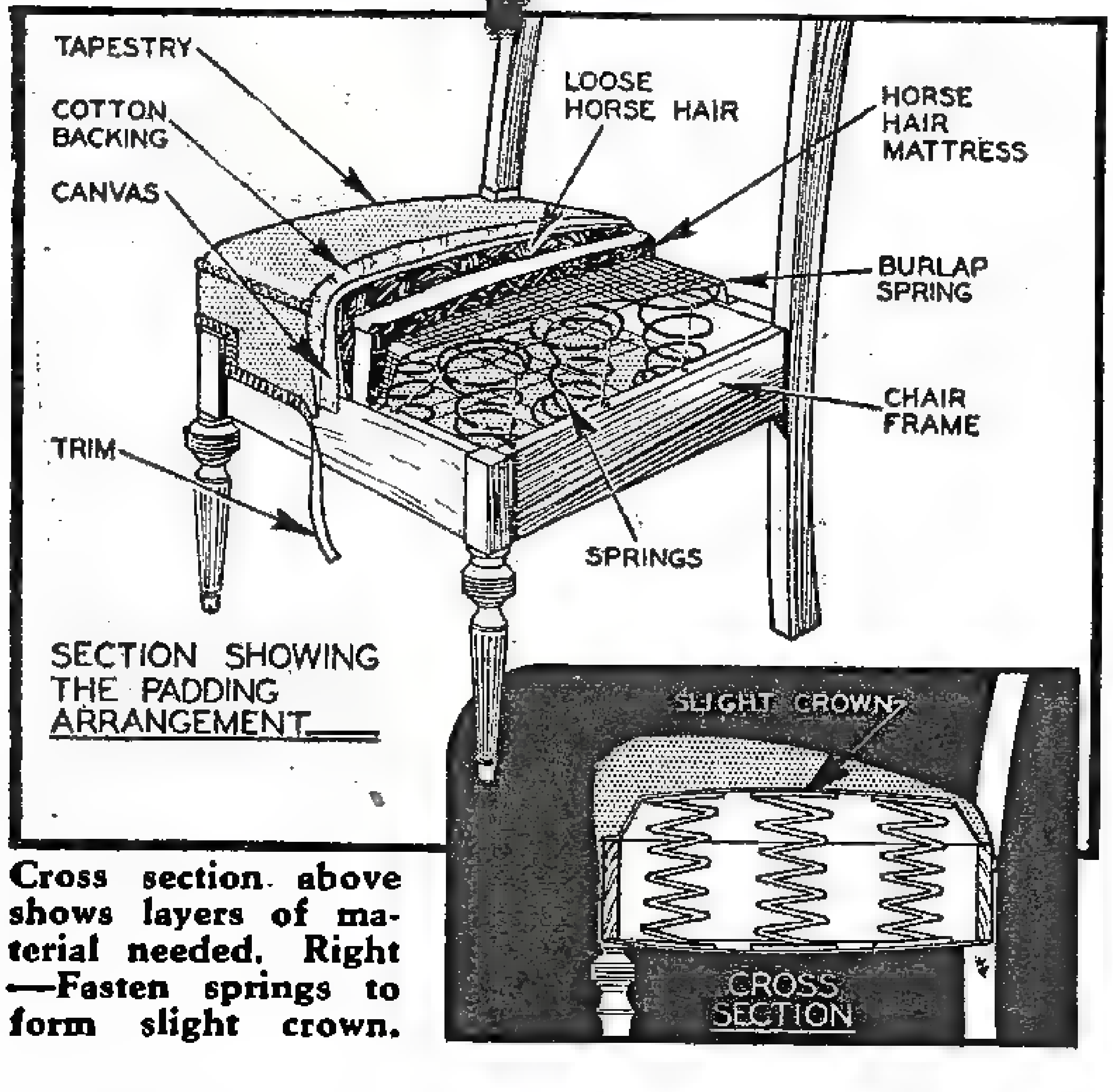
SEE FEBRUARY M-M

IDEAS in $500.00 Contest





Pull webbing taut with 8 in. board padded at one end and sharpened nails at other. Put padded end against chair, catch webbing on nails, with leverage action draw taut.



Cross section above shows layers of material needed. Right—Fasten springs to form slight crown.

allowing 1½" between each strip. To freshen up the old job, light canvas, cotton batting and burlap should be included on the shopping list.

A half-dollar will cover the cost of a magnetized hammer, a 3" curved upholstery needle, tacks and upholstery twine. Much time can be saved by using a magnetized hammer to set the tacks in close quarters.

Begin by removing the tumble-down upholstery with a screw-driver. Clear the chair right down to the "bone." Make sure that you have lifted out all the old tacks embedded in the tack panel. The old tapestry, padding, etc., should not be immediately destroyed but preserved to insure accuracy in measuring all new parts. There will be future use for most of them.

The webbing which serves as the foundation for the springs is basket-woven across

(Continued on page 129)

FOR THIRD CONTEST

RULES FOR SECOND CONTEST

Suggestions for building or rebuilding any article of furniture used in the home can be entered in this contest.

Readers can submit as many entries as they wish. Entries may be submitted in all four contests and prizes won in all four.

Furniture ideas must not call for professional services. All work must be within the scope of the average home workshop man.

Each entry must include a written description of 1,000 words or less, giving detailed instructions on building or rebuilding one article of furniture. Rough sketches to illustrate the design or work involved should be included. Photographs are not required. Do not submit actual articles of furniture.

Fourteen prizes will be awarded for the best and most practical ideas as follows: first prize $60.00; second prize $20.00; third prize $8.00; five fourth prizes at $5.00 each; six fifth prizes at $2.00 each; total $125.00.

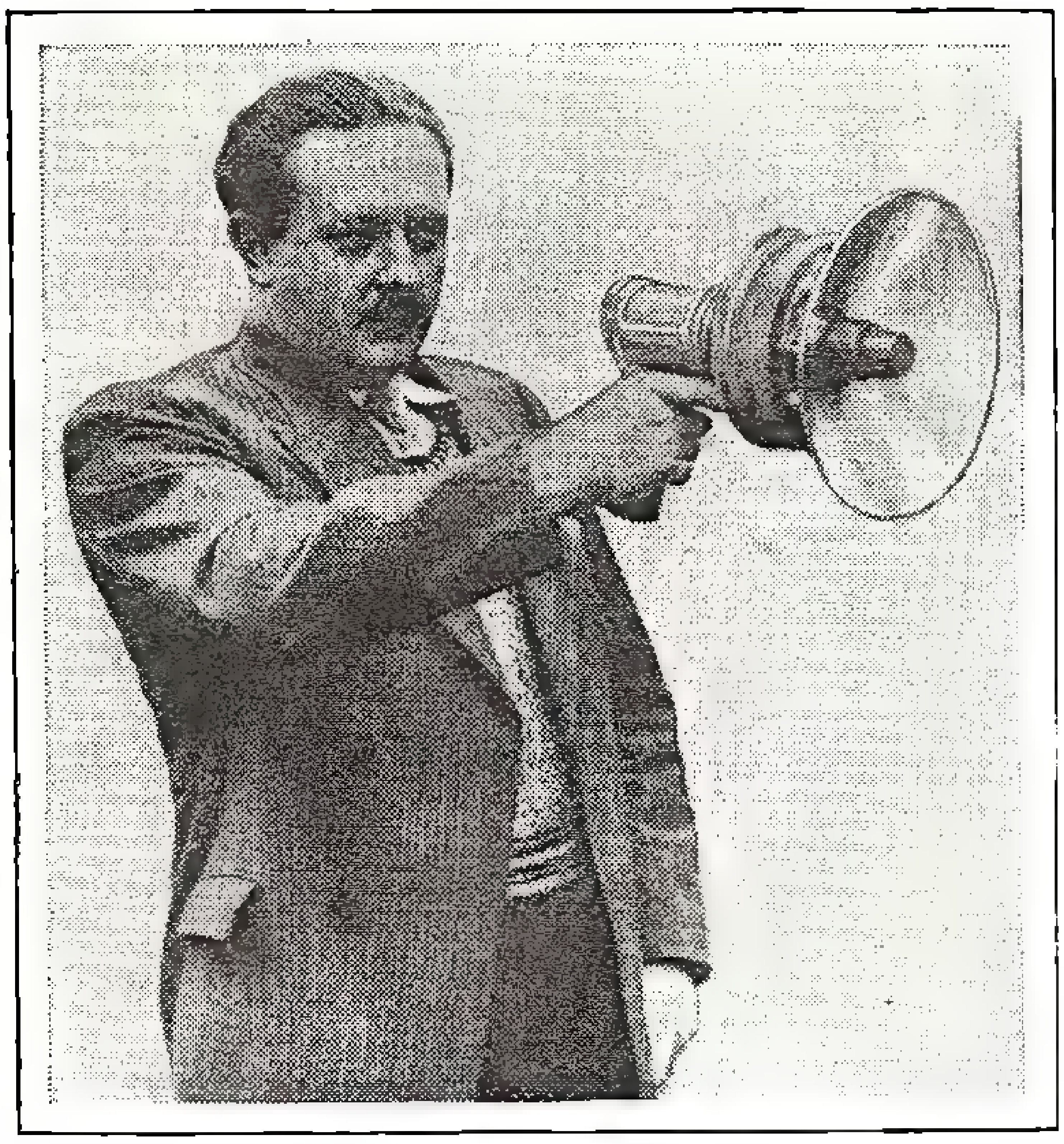
Modern Mechanix and Inventions reserves the right to publish any entry winning a prize without further compensation to contestant.

Each contestant agrees to permit Modern Mechanix and Inventions to publish all or part of any entry not winning a prize. Entries so used will be paid for at regular rates for the amount of material published.

No entries will be returned.

Address entries to Furniture Contest, Modern Mechanix and Inventions, 529 S. Seventh St., Minneapolis, Minn. All entries must reach this office before midnight, January 22, 1935. Winners will be announced in the April, 1935, issue of Modern Mechanix and Inventions. The third contest in this series will be announced in the February issue. The first contest was announced in the January issue.

German Death Ray Pistol Stuns Animals at Mile Range



This death ray gun is said to be capable of stunning men or animals at one mile range. The queer magnesium pistol is being demonstrated in Paris by its German inventor.

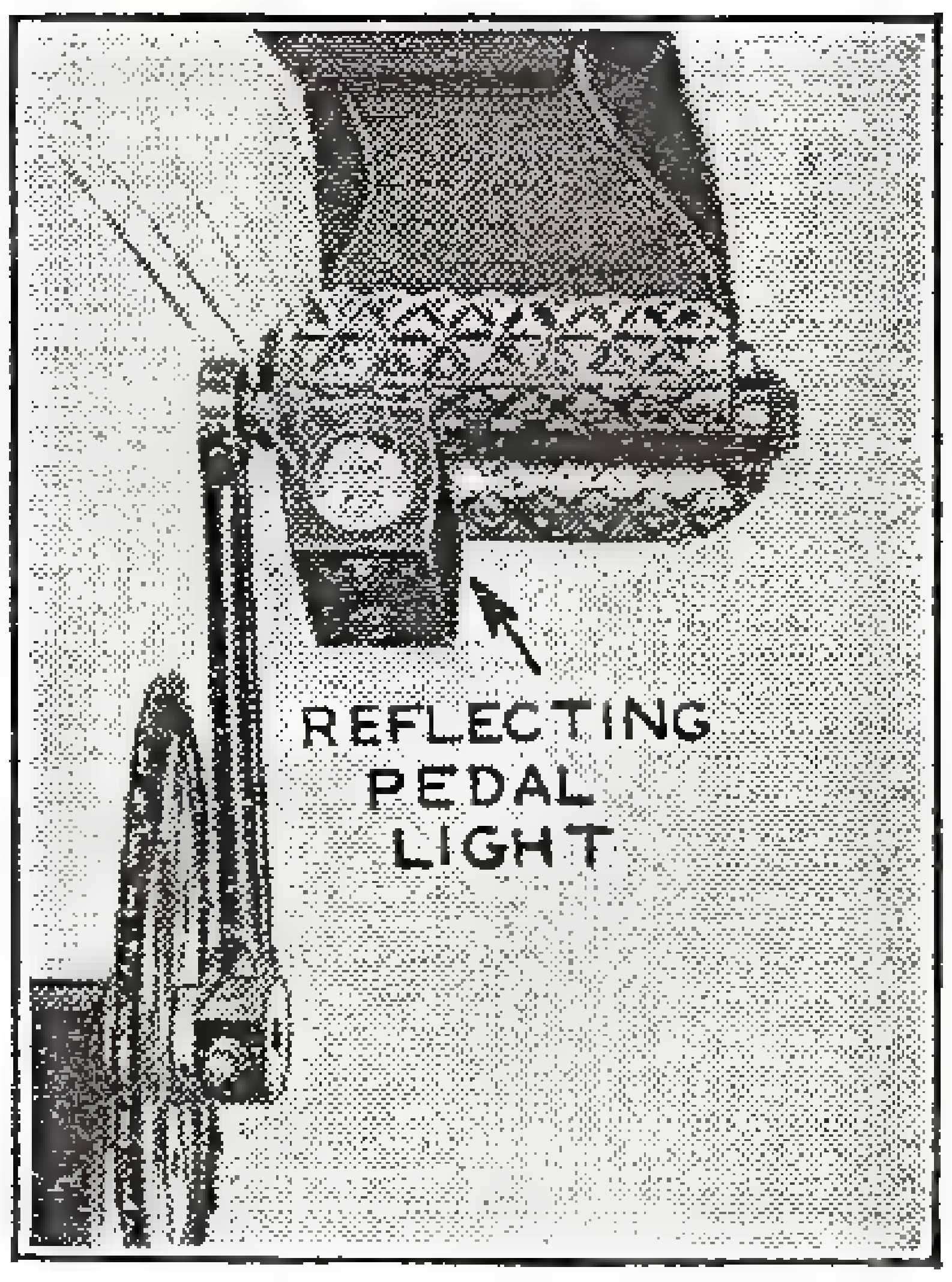
AN ODD-LOOKING pistol firing a magnesium charge said to be capable of stunning men and animals a mile away is now being demonstrated in Paris. Its inventor, a German who was forced to flee from his native land, hopes to sell the idea to the French government.

Scientists believe the operation of the device is based upon the "thermit reaction" now used in certain welding operations. The reflector mounted on the barrel of the gun would concentrate the deadly heat rays, and protect the operator from the dazzling glare of exploding magnesium.

Bike Pedal Light Warns Motorists

COLORED reflectors designed for mounting on bicycle pedals were recently introduced in England as part of a "safety first for cyclists" movement.

The colored glass crystals, being continually in motion as the cyclist pedals along, glow brilliantly when in headlight beams of approaching cars.



Colored reflecting crystal mounted beneath each bicycle pedal gleams in the glare of approaching car, warning motorist.

Tree Wrecks Piccard Strato-Balloon

ASCENDING ten miles into the stratosphere on the trail of the mysterious cosmic ray, Dr. Jean Piccard crashed into a tree in landing, wrecking the giant balloon and slightly damaging the gondola.

Mrs. Jeanette Piccard, who accompanied her husband on this latest visit to the purple stratosphere, is the first woman ever to brave the hazards and intense cold of the ascent.

The silvery bag soared aloft from the Detroit, Michigan, airport, remaining in the air for eight hours while the Millikan apparatus clicked away its record of cosmic ray arrivals.

No attempt was made to set a new altitude record by releasing ballast. With a solid bank of clouds separating the earth from the Piccard party, it was thought inadvisable to risk tumbling through the clouds on the descent without ballast for emergencies.

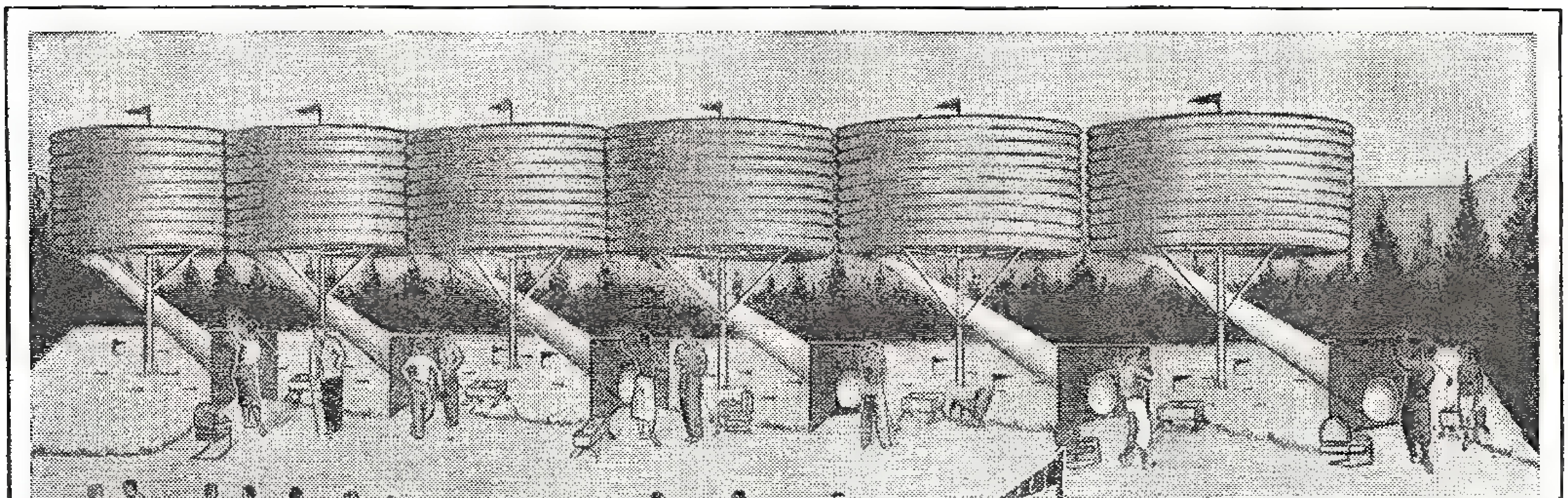
Though the landing was, in the words of Mrs. Piccard, "a mess," none of the scientific instruments were damaged.

Upon developing the cosmic ray film record, Dr. H. V. Neber, assistant to the famous Dr. Millikan at Cal Tech laboratories, said, "It is one of the best recordings ever made."

PEOPLE'S OUTFITTING CO
GRUNOW RADIOS

Dr. Jean Piccard and his wife climb into hermetically sealed gondola for take-off into stratosphere. Photo at right shows huge bag rising from airport.

Rotary Golf Game Affords Winter Practice

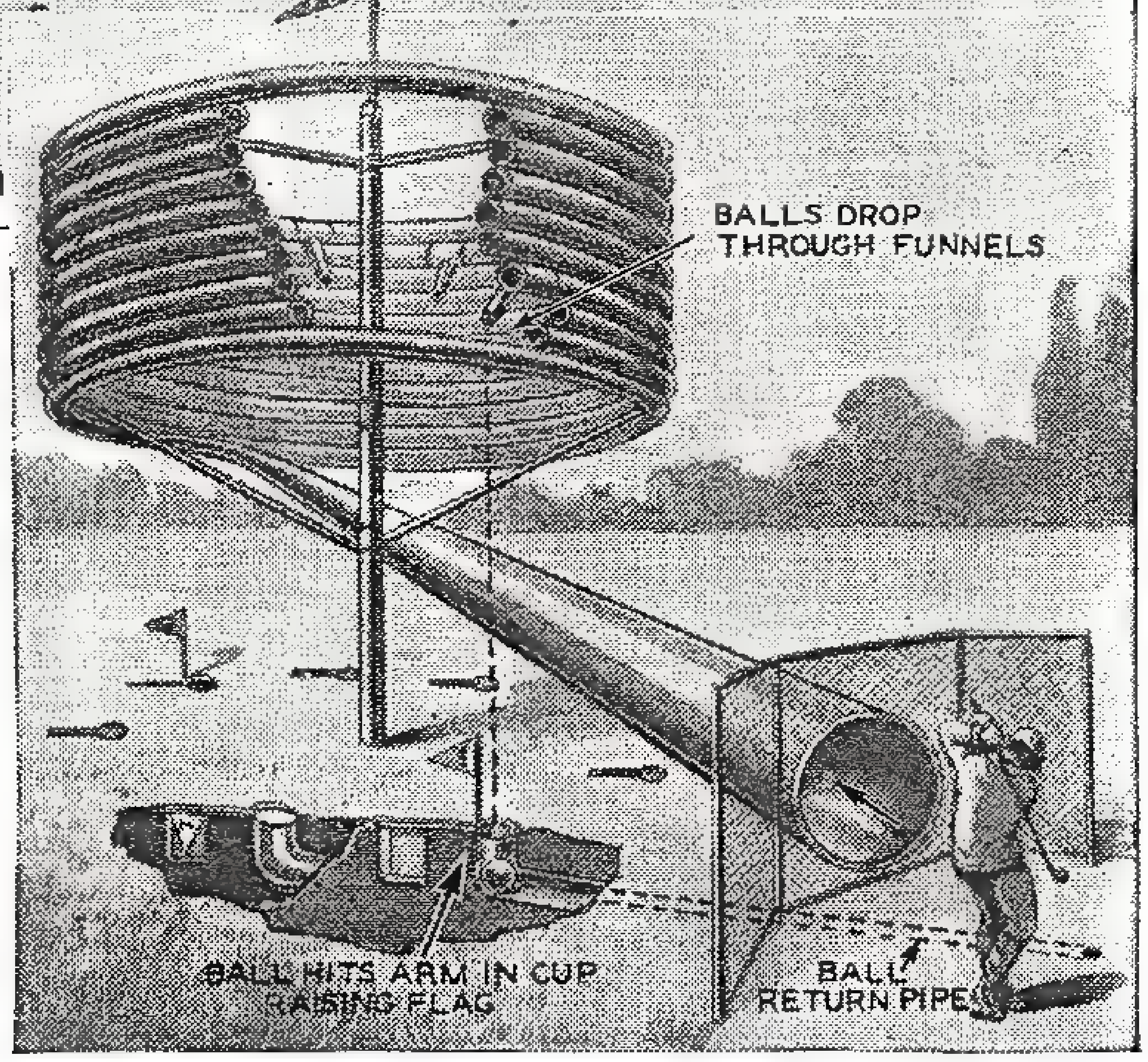


INVETERATE golfers who insist upon keeping their swings grooved the year 'round will welcome a new device which combines practice and pleasure in a novel manner.

The apparatus consists of 10 tubular metal coils, 15 feet in diameter. These surmount a 20 foot funnel-shaped approach, set at an angle of 25 degrees to the driving tee.

The distance traveled by the ball through the metal tubes indicates the length of the drive. At intervals of 15 yards a red neon light, attached to a sensitive mercury switch, shows the player what yardage he has attained.

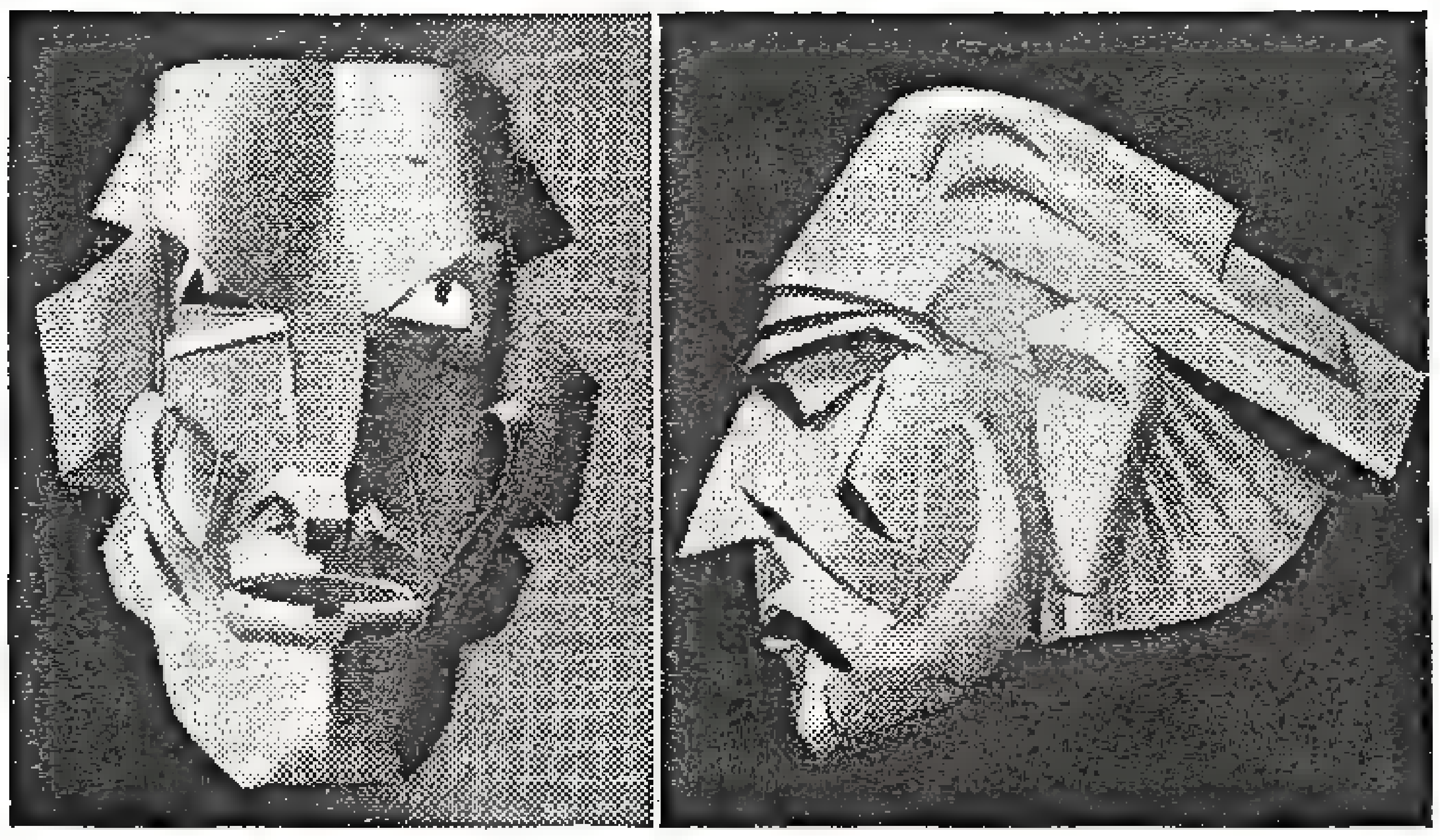
Only hard, perfectly hit drives register in the 300 figures. Hooks and slices penalize the golfer as in actual play. The ricocheting action of an off-line ball naturally slows the forward motion and cuts down the theoretical yardage. Netting protects players and spectators from wild shots.



In addition to registering yardage by neon lights, device drops golf balls through funnels to score various holes. A return pipe brings the balls back to the driving tee.

Artist Makes Pasteboard Masks

A NEW sculptor's medium has been devised by Stanislaw Raczinsky, Polish artist, who utilizes colored pasteboard, skillfully cut and clipped together, to make striking, modernistic masks.

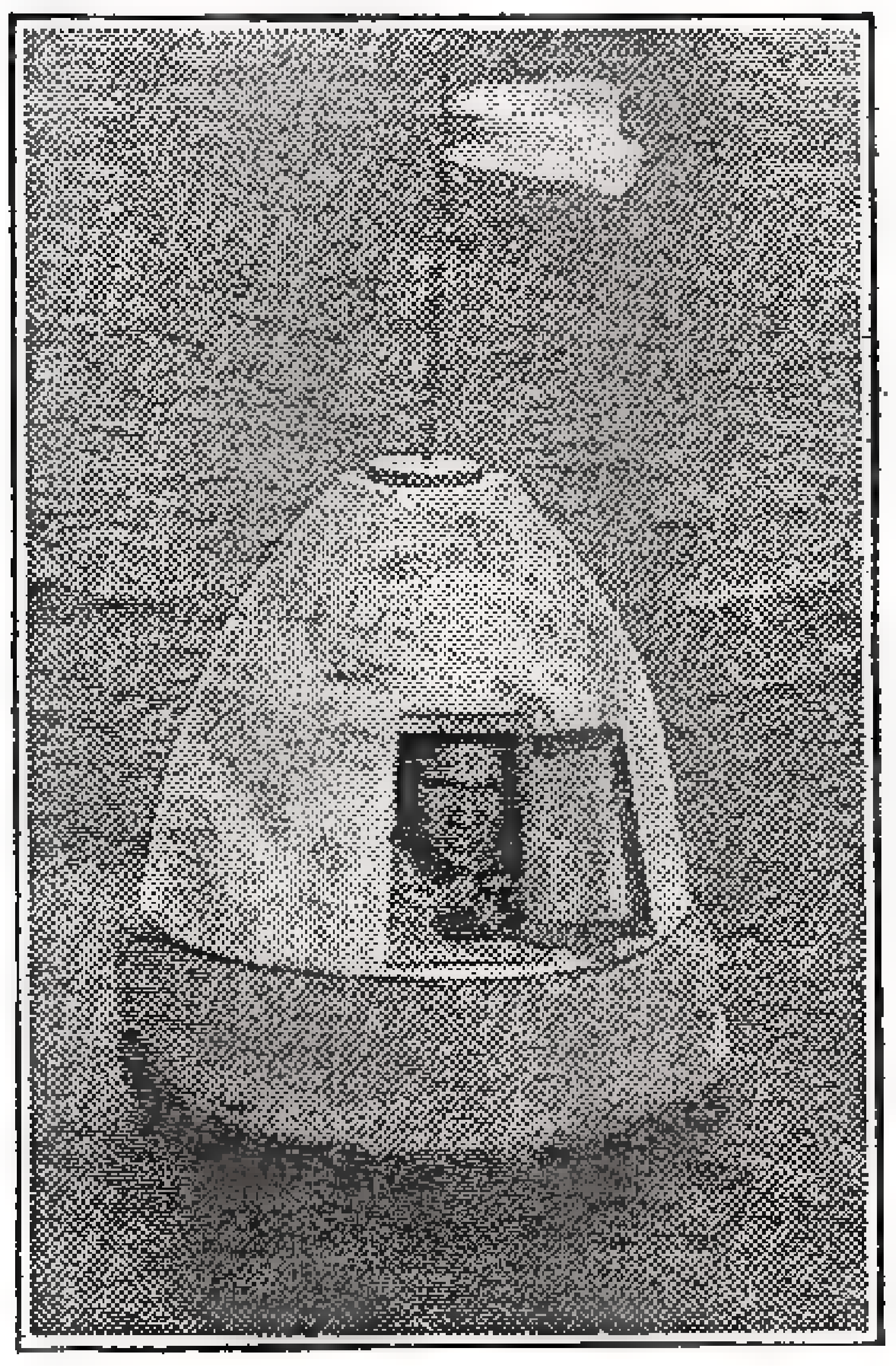


Shown above are two of the masks skillfully fashioned from colored pasteboard by the Polish artist, Raczinsky.

"Cabin" Life Preserver Tested

SHIPWRECK at sea may be robbed of some of its terrors with the introduction of a new de luxe life preserver resembling a small-sized navigation buoy. The "cabin," or upper part of the device, is equipped with a combination door and window which may be closed against the threat of heavy waves.

Made of inflated rubber, the device is composed of two sections, as a safety measure. Thus, if one section becomes deflated, the other still serves as a spare. Atop the preserver is a small flag to attract the attention of any possible rescue craft.



Closeup of cabin life preserver, showing observation window.

SEEKING WEALTH in

by JAMES NEVIN MILLER

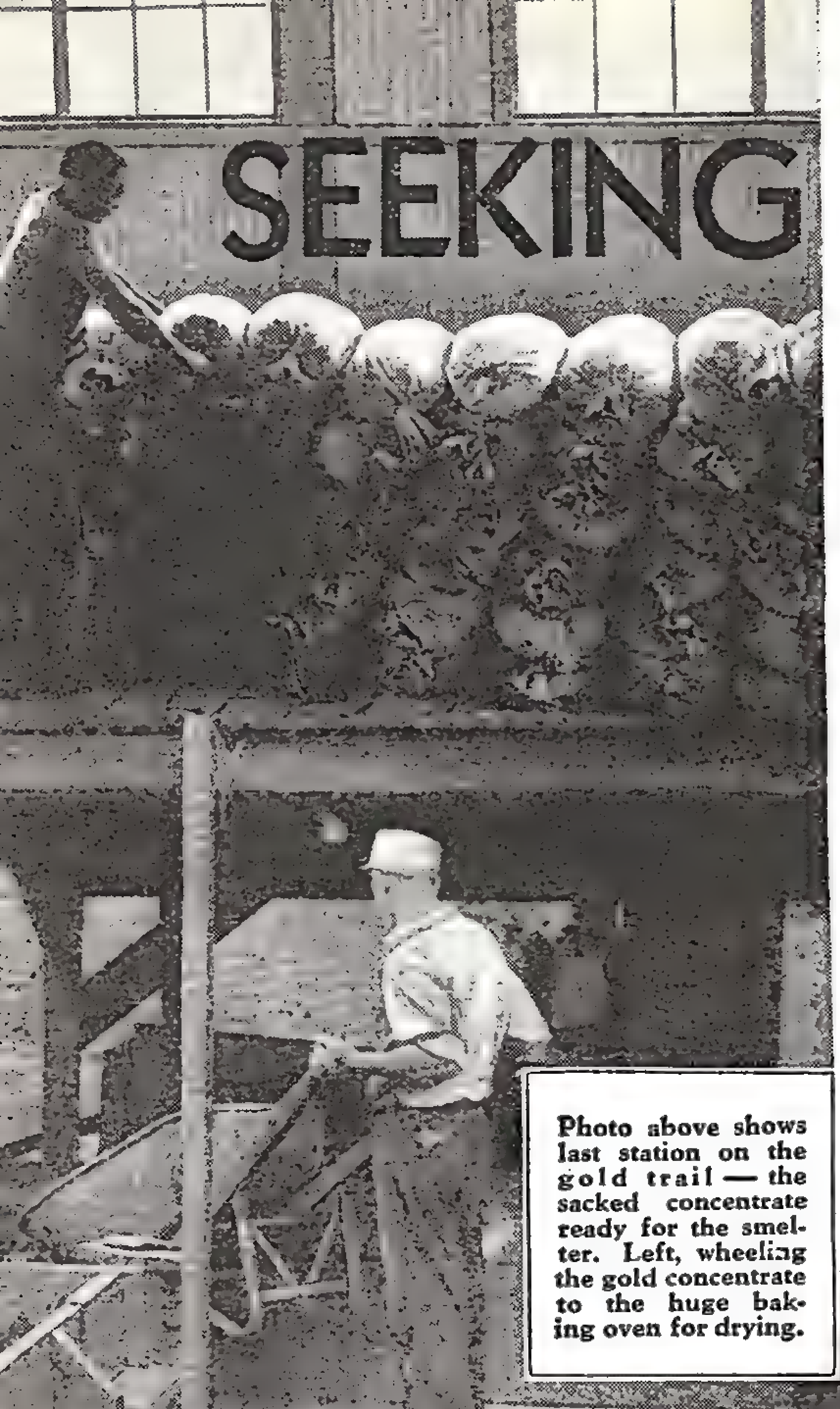


Photo above shows last station on the gold trail — the sacked concentrate ready for the smelter. Left, wheeling the gold concentrate to the huge baking oven for drying.

ONLY a few miles from Rapidan Camp, Virginia, where President Hoover once maintained his summer White House, a vein of gold is being worked that promises to develop into one of the richest ever discovered in the East or South.

The nation's newest gold diggings center in the Melville and Vaucluse mines near Wilderness, about 20 miles southwest of Fredericksburg—the heart of the historic region where some 30,000 Confederate and Federal troops perished in the bloody battle of the Wilderness.

Although activities in the district are new, the mines themselves are not recent discoveries. Worked in the days prior to the California gold rush, the mines were later abandoned as the nation's gold seekers turned to more heavily paying fields. Then the government stepped in recently and set a new value on the precious metal—officially pegged the price of gold at $35 an ounce

Into the revolving masticator shown above, the ore is placed and broken down preparatory to the "flotation" process described in the text. At right, one of the tiny ore cars, deep in the mine. Thus far, about 1600 tunnels have been laid along the gold vein.

FOLLOWING THE TRAIL OF PRECIOUS METAL

Virginia's New Gold Rush

—and the wheels of the mining industry again began to hum in the Virginia hills.

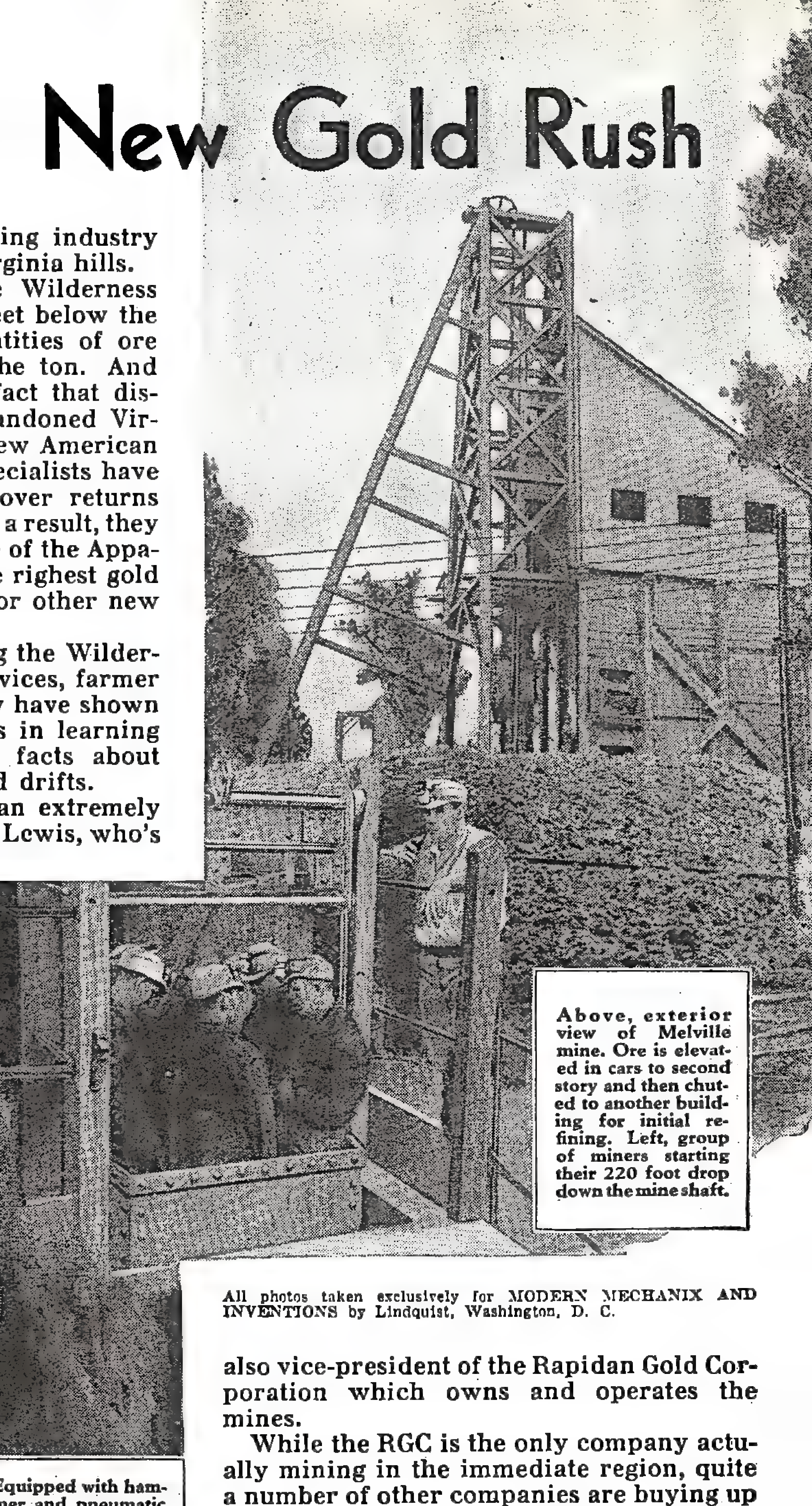
Today the workers in the Wilderness mines have sunk shafts 220 feet below the surface and are mining quantities of ore which assays around $5 to the ton. And even more important is the fact that discovery of pay dirt in the abandoned Virginia diggings may create a new American gold field. Federal mining specialists have been fired with enthusiasm over returns from the Wilderness mines. As a result, they are planning a thorough probe of the Appalachians, once regarded as the righest gold region in the United States, for other new or abandoned mines.

Most of the 75 men working the Wilderness mines today are rank novices, farmer boys in fact. But thus far they have shown themselves to be adept pupils in learning the necessary semi-technical facts about blasts, ore faces, mucking and drifts.

Supervising their work is an extremely able mining engineer, C. Hyde Lewis, who's also vice-president of the Rapidan Gold Corporation which owns and operates the mines.

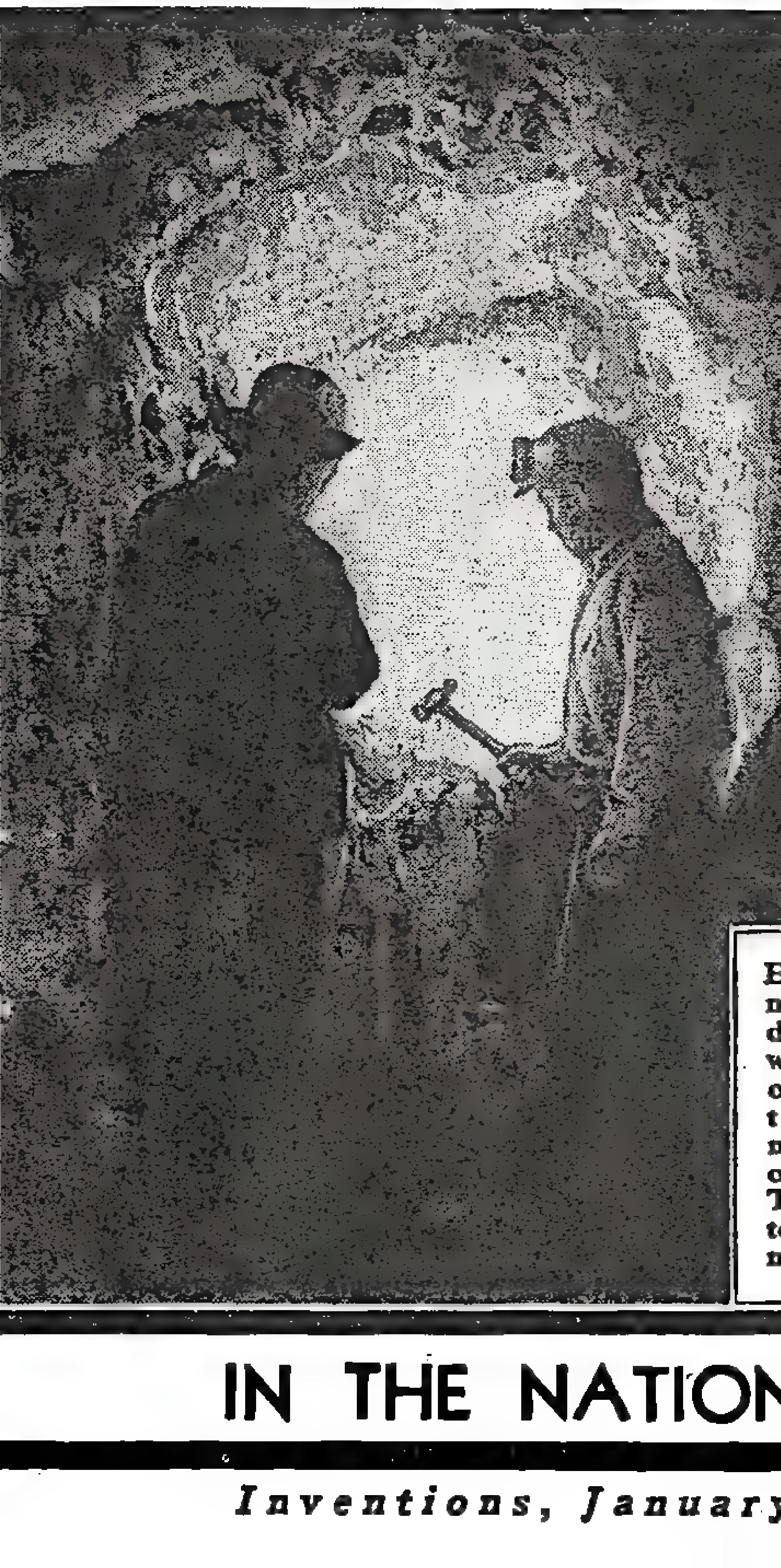
While the RGC is the only company actually mining in the immediate region, quite a number of other companies are buying up much of the nearby land for the purpose of sinking exploration shafts. Among these is a prominent Pittsburgh outfit, while a handful of wealthy Canadian engineers are continually browsing about.

(Continued on page 119)



Above, exterior view of Melville mine. Ore is elevated in cars to second story and then chuted to another building for initial refining. Left, group of miners starting their 220 foot drop down the mine shaft.

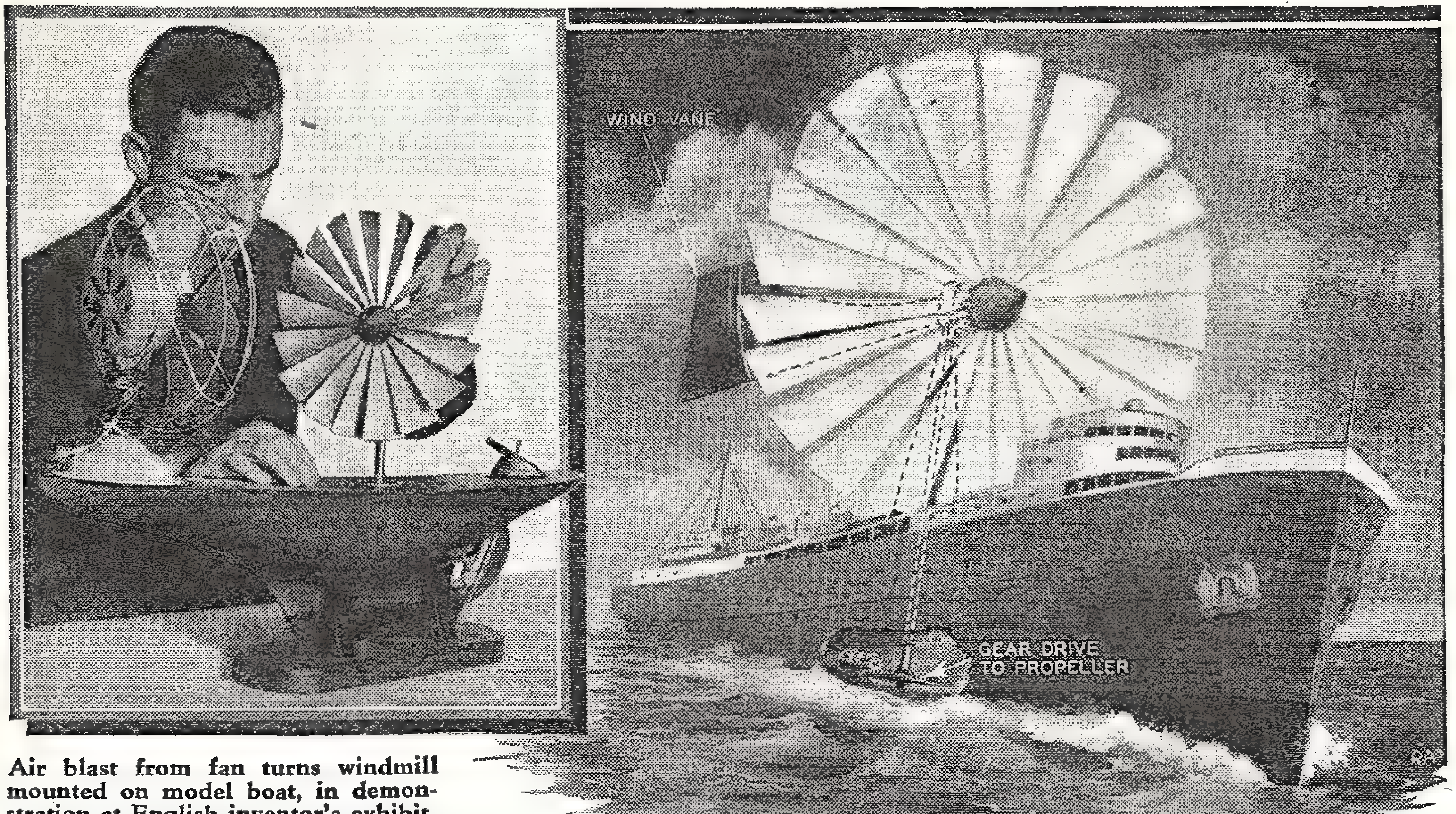
All photos taken exclusively for MODERN MECHANIX AND INVENTIONS by Lindquist, Washington, D. C.



Equipped with hammer and pneumatic drills, miners are wresting quantities of paying ore from the abandoned mines recently reopened in Virginia. The ore is estimated to assay approximately $5.00 a ton.

IN THE NATION'S NEWEST GOLD DIGGINGS

Wind-Propeller Sails Proposed For Liners



Air blast from fan turns windmill mounted on model boat, in demonstration at English inventor's exhibit. At right is artist's conception of ocean liner using the wind-propeller sails.

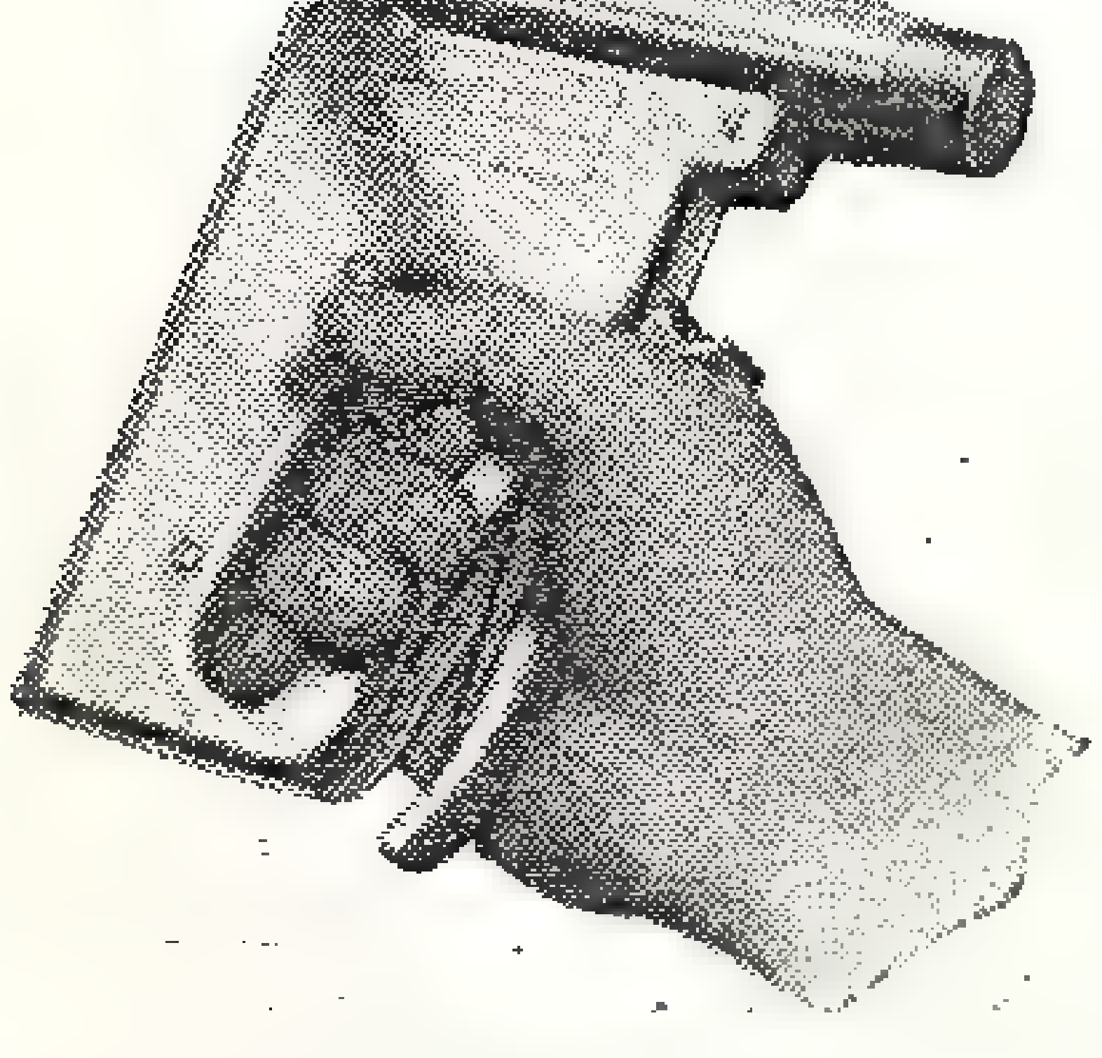
GIANT fan blades whirling rapidly in ocean breezes are proposed by an English inventor as a substitute for both sails and engines on ocean-going vessels. Mounted high above deck, the whirling propeller would transfer the wind's unlimited power to the marine screw propellers of the boat.

A working model of the windmill ship was on demonstration at the Inventions Exhibition sponsored by the Institute of Patentees at Westminster, England.

Since the propeller could face into the wind regardless of the direction the ship is traveling, it is believed highly probable that windmill boats could travel directly into the wind.

A generator mounted on the windmill tower could develop current for electric motors mounted on the propeller shafts, or a shaft could be used to transmit the power.

Tack Hammer Has Automatic Feed



Squeezing trigger of new tack-hammer releases spring, automatically setting a staple and driving it in with one blow.

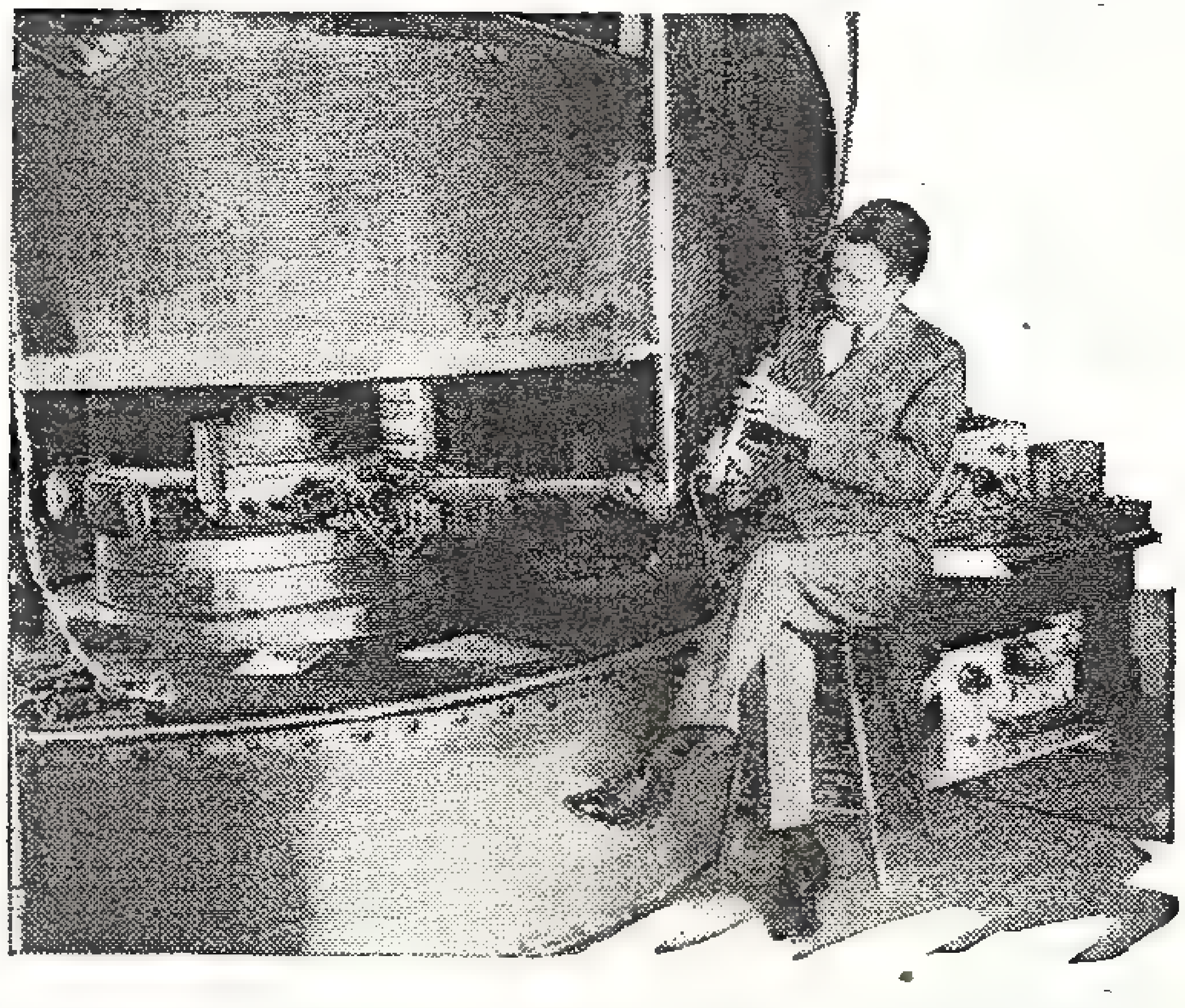
AN AUTOMATIC staple-driving hammer operating like and resembling an automatic pistol drives staples home with a single blow when the trigger is pulled. The device holds a clip of fifty tacks at one time.

Radium Produced From Table Salt

AS THE first practical transmutation of one material to another, a process for changing common table salt into a radium-giving salt has been announced by Dr. E. O. Lawrence, professor of physics at the University of California.

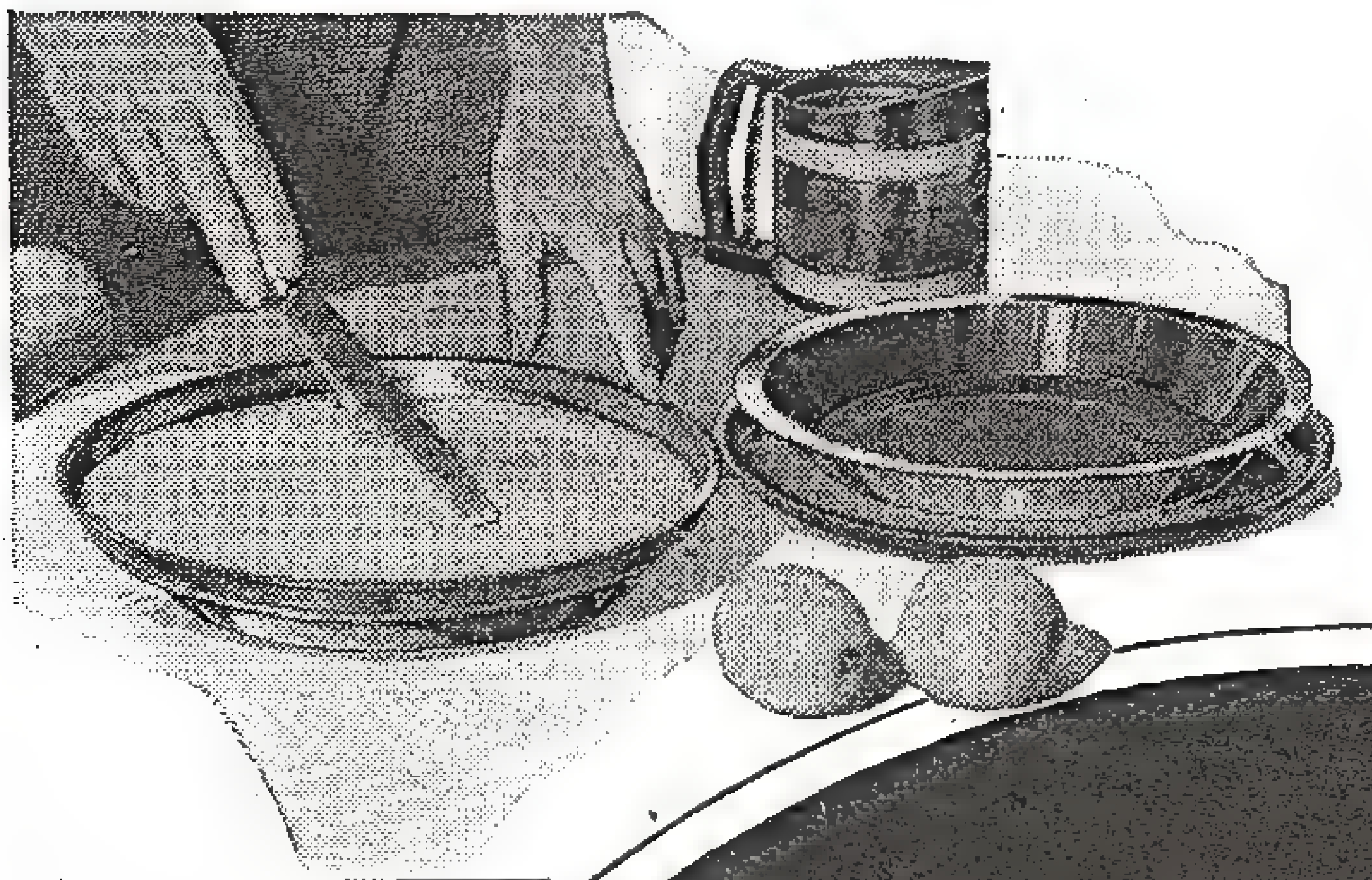
Though the salt radium is no different in appearance from common salt, it gives off rays more powerful than those ordinarily obtained by physicians from pure radium. The new salt costs less than radium.

Since salt is harmless, medical experts believe solutions of the new radium can be injected directly into cancer areas.

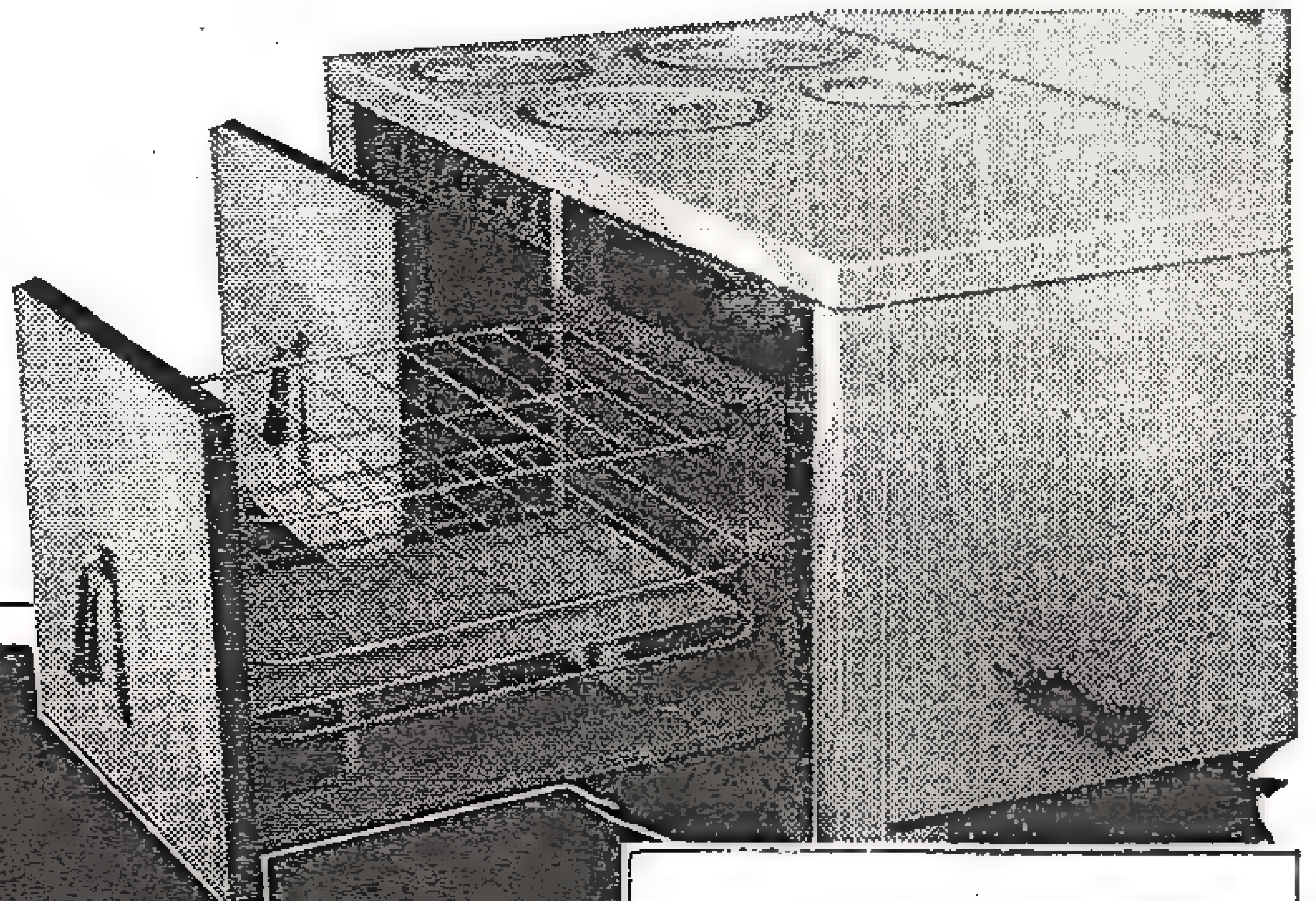


Prof. E. O. Lawrence is pictured above with elaborate apparatus he used in changing common salt into radium-giving material more powerful for medical use than pure radium.

Ice Finger, SPINNING COFFEE POT *Make* HOME TASKS *More* PLEASANT

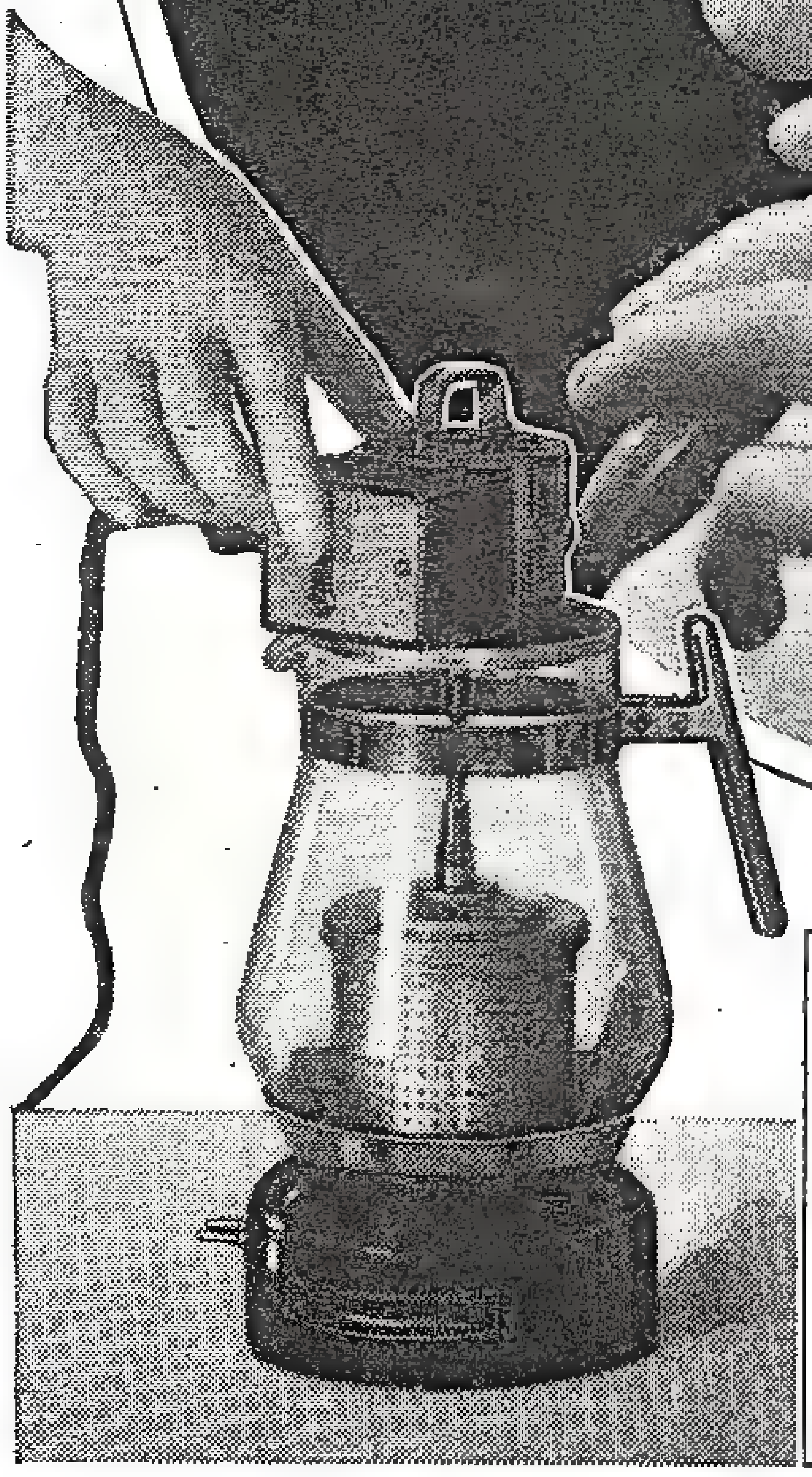


PIE PLATE RIM, easily snapped in place, prevents juices from running over edge into oven, allows baking of extra-thick pastries.

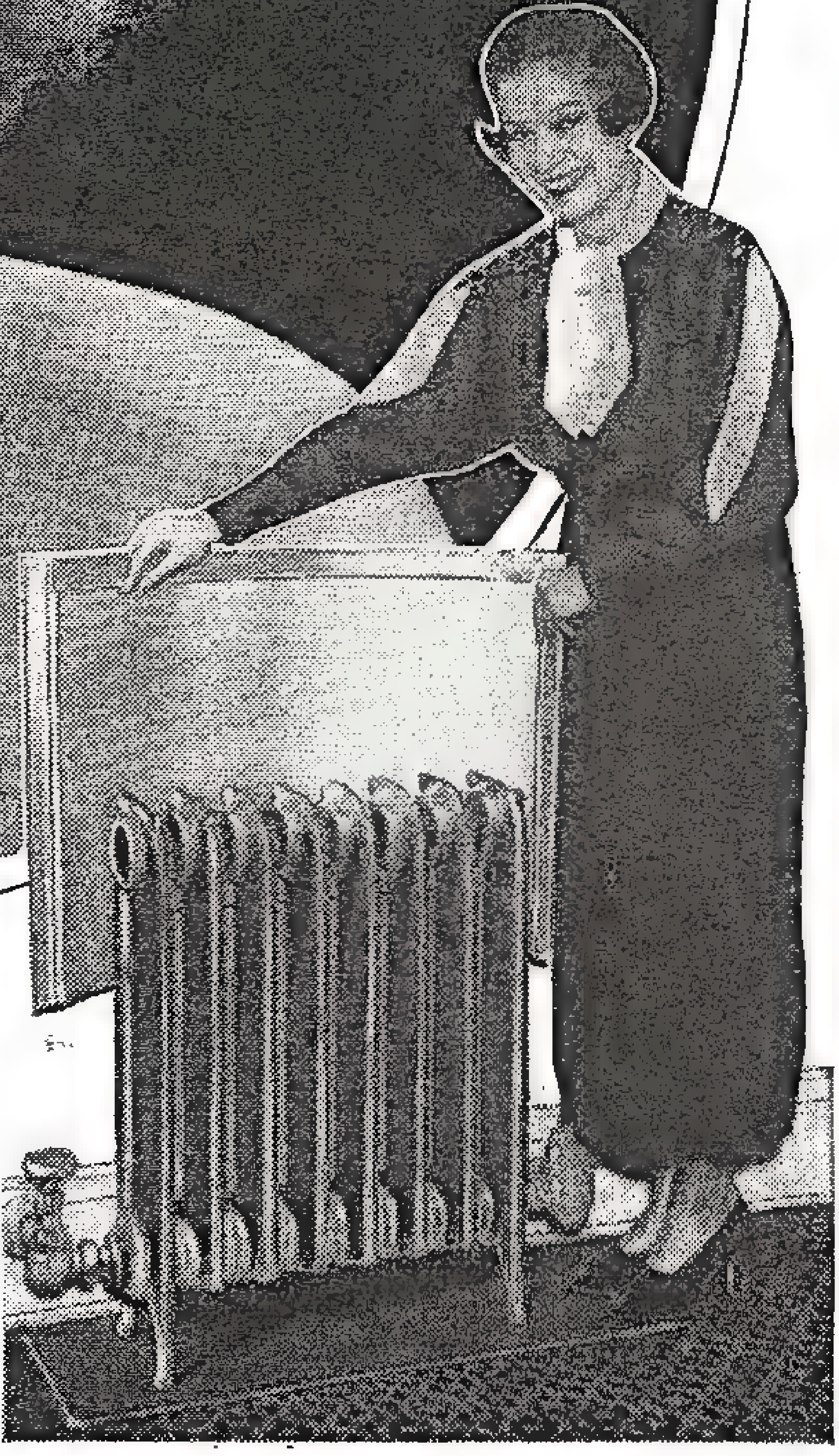


DRAWER OVEN for electric range works like filing cabinet, eliminating stooping to inspect baking. Compartment slides out on roller bearings, rear panel keeping heat in oven if drawer is out.

ICE MASSAGE finger closes pores of skin, stimulates circulation same as piece of ice does, without annoying drip of water. Metal tube is filled with refrigerant solution, and cooled by storing in icebox just before using.



SPINNING COFFEE POT whirls hot water through ground coffee at high velocity, making coffee from hot water in from 1 to 4 minutes, depending upon flavor and strength preferred.



HEAT BOUNCER in form of thin aluminum sheet slips back of radiator, throws heat out into room by reflection from foil.

Previewing AMERICA'S

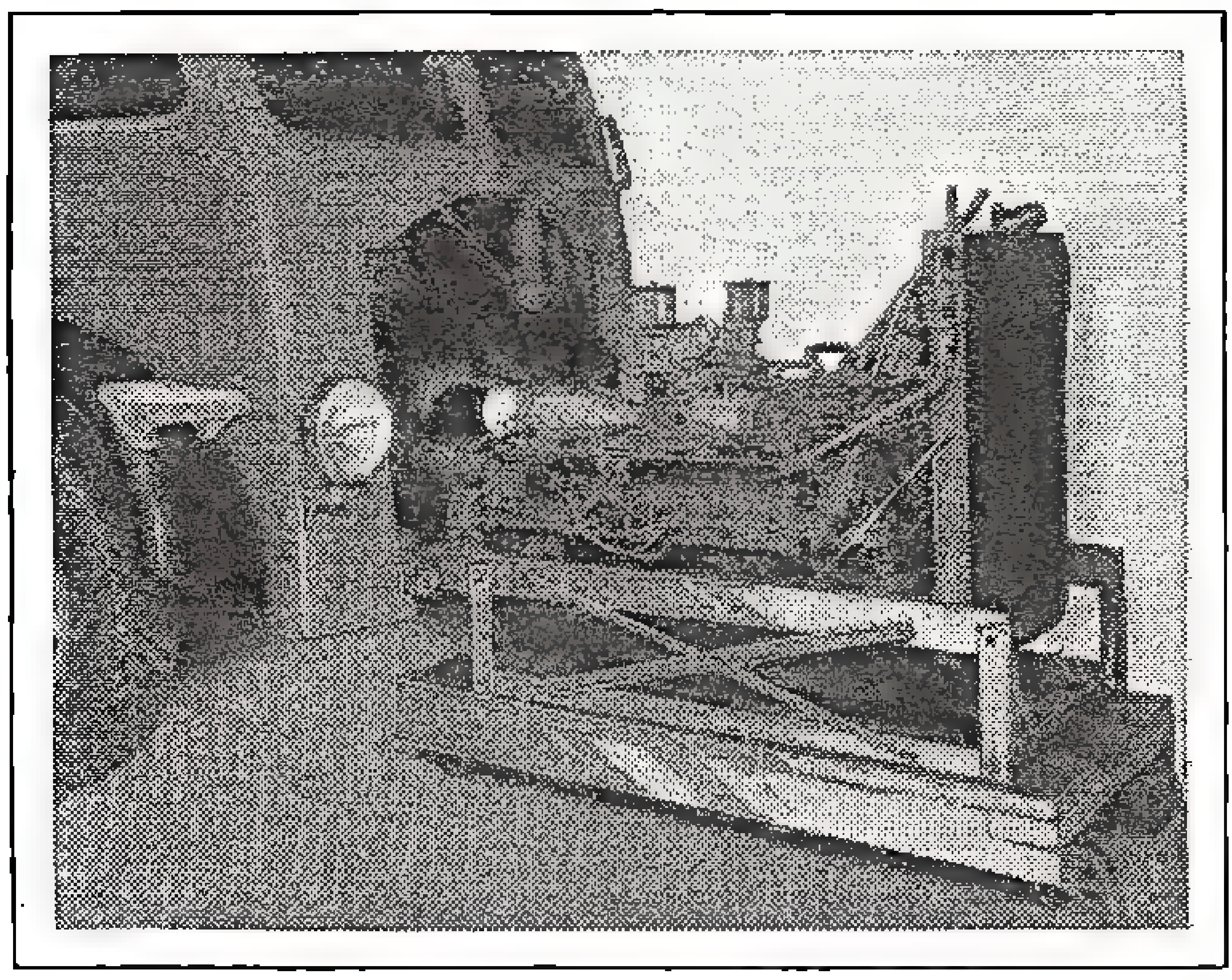
by GLENN JENKINS

Streamlines continue to hold the spotlight. Chrysler's "bull nose" hood is said to be out, and the "hound's nose" is in. Beaver-tails are bigger and broader, anticipating the rear-mounted engine. Here is the latest advance information on America's 1935 automobile—how it is built and what it will look like.

MANY new and important improvements have been built into the new 1935 automobile models. Greatest strides have been made in engineering, rather than design, although the latest cars show a decided continuation of the streamline idea, emphasizing refinement of the so-called flowing lines which startled motordom last year.

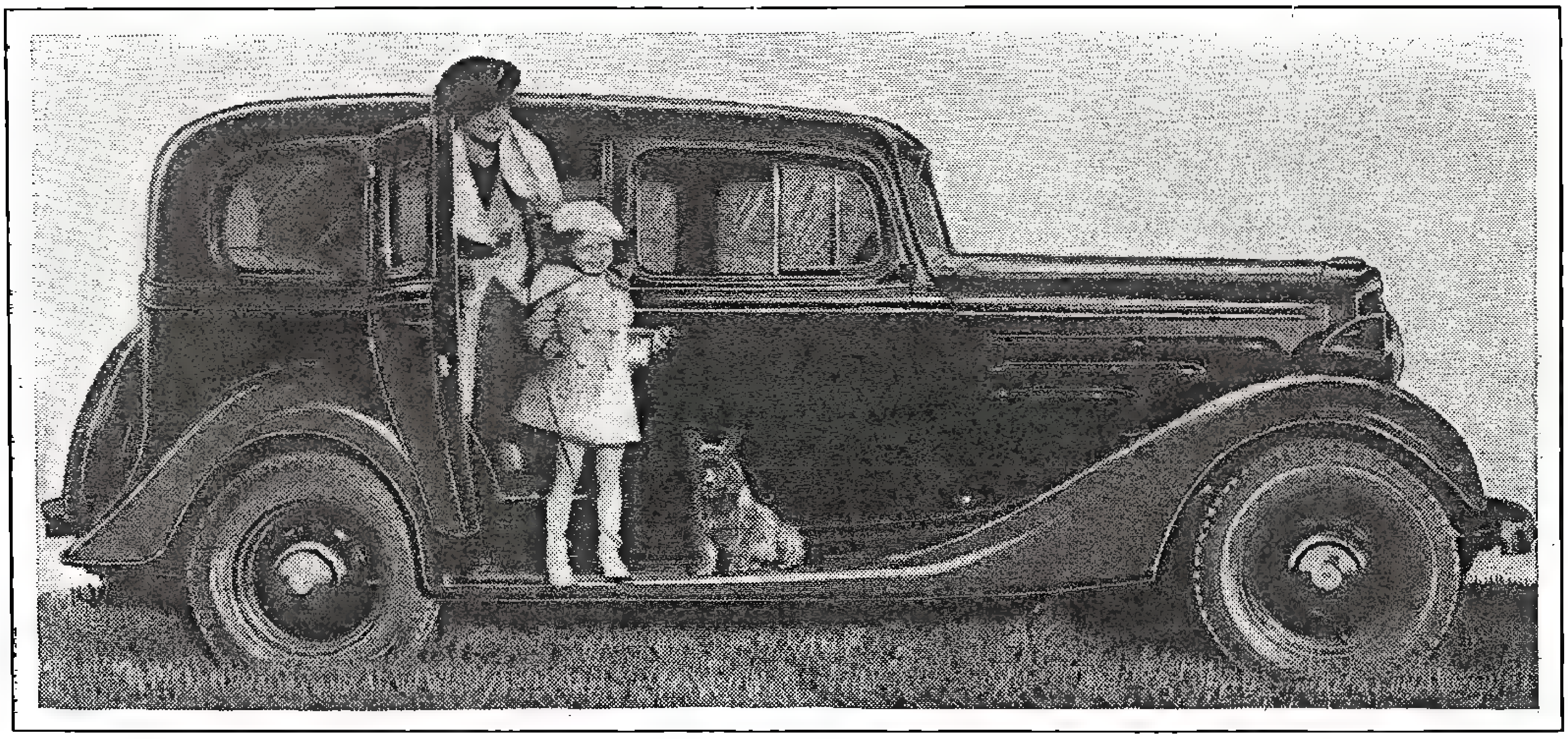
Engineers, through discovery and invention, have been able to add from 25,000 to 50,000 miles to the life of the average car. As a matter of fact, more real engineering is now going into the light car than ever, because the competition there is keener and every manufacturer is straining himself to give the most for the money.

Greatest interest this year centers around the Chrysler group, which includes Plymouth, Dodge, DeSoto and Chrysler models. The airflow lines, when they are seen for the first time at the New York Show, will have undergone refinement. Chrysler engineers have made it known that the airflow trend is scientifically correct and they will continue in that direction. Therefore, changes, according to advance information, will be in refinement of the front end to do away with the "bull nose." The car of the future, according to Chrysler designers, will have a nose like that of a hound, outstretched and going places in a hurry. The tendency is to design lines and contours that will give the impression of speed even though a car may be standing still.

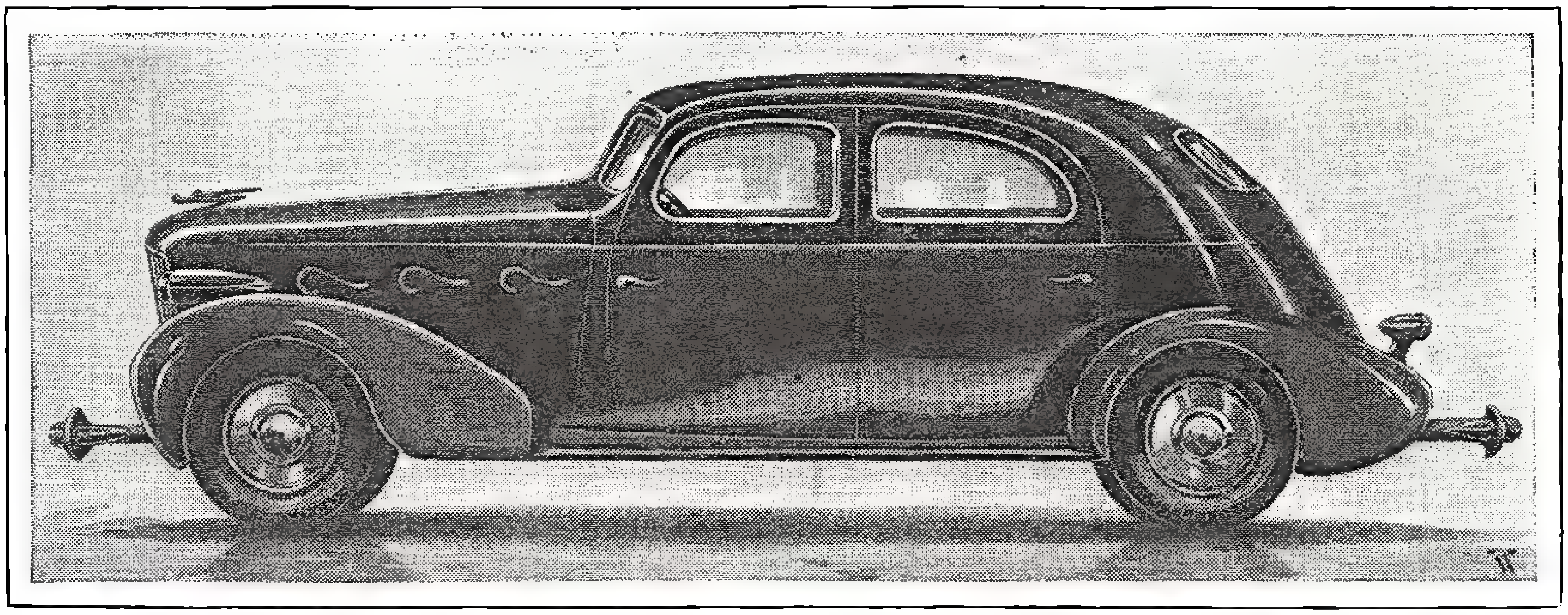

White introduces a truck engine with horizontally opposed cylinders, which can be pulled out on a dolly.

The most pronounced development of the year is the treatment of the rear ends of many models. The beaver tail is more affected and refined. The reason for this, as explained by one leading designer, is to get the public accustomed to this style, because the beaver-tail lines are necessary to house the engine in the event that it is moved from under the hood to the rear axle.

Henry M. Crane, technical assistant to the president of General Motors, gives an inti-


Chevrolet broadens its line with a new four-door, five-passenger sedan, said to set a new price low in the six and eight cylinder field. Extra leg room for rear seat passengers is provided in the new models by recessing back of front seat.

1935 AUTOMOBILES



Chrysler engineers have definitely adopted the airflow principles, but advance information indicates that the "bull nose" is doomed and will be superseded by the "hound's nose" design similar to that illustrated in the photo above.

mation of the attitude of GM by declaring that only gradual changes in car design are being undertaken. General Motors points to Cadillac and LaSalle design as its ideal of streamlining, and is expected to follow this trend.

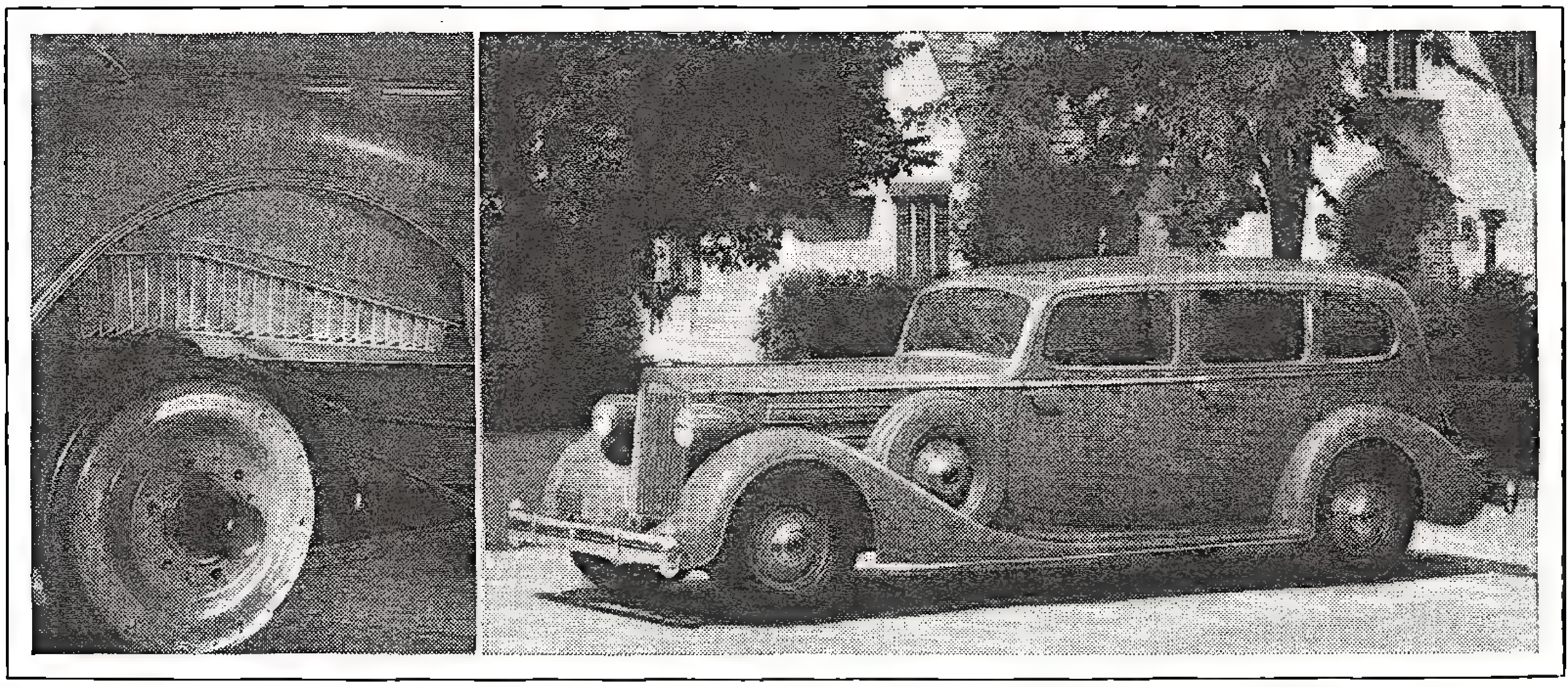
Mr. Crane declares that improvement in brakes have not kept pace with speed increase, and much must be done to effect needed changes, though radical departures seem to him as unlikely. Wider use of cast iron drums is anticipated and much needs to be done to assure uniformity of brake action under varying weather conditions.

Packard engineers have solved the problem of designing louvres in keeping with the streamline trend by locating them under the front fenders. Heat from the motor passes through these louvres, travels along the under side of the fender and away from the body, excluding motor heat from the car's interior. The new treatment affords designers more freedom in handling the ornamental space formerly occupied by the louvres. Another new Packard feature is a model seating nine passengers—three on the back seat, three on the folding seats and three in front. Persistent rumors also indicate that Packard will produce a light car destined to offer competition in the medium-priced field.

Hupmobile's most startling announcement for 1935 is the inclusion in its line of a 5-passenger, 4-door sedan which lists at less than $700. The new model develops 91 h.p. and has a 117 inch wheelbase. Power brakes are a feature of all models in the 1935 Hup line.

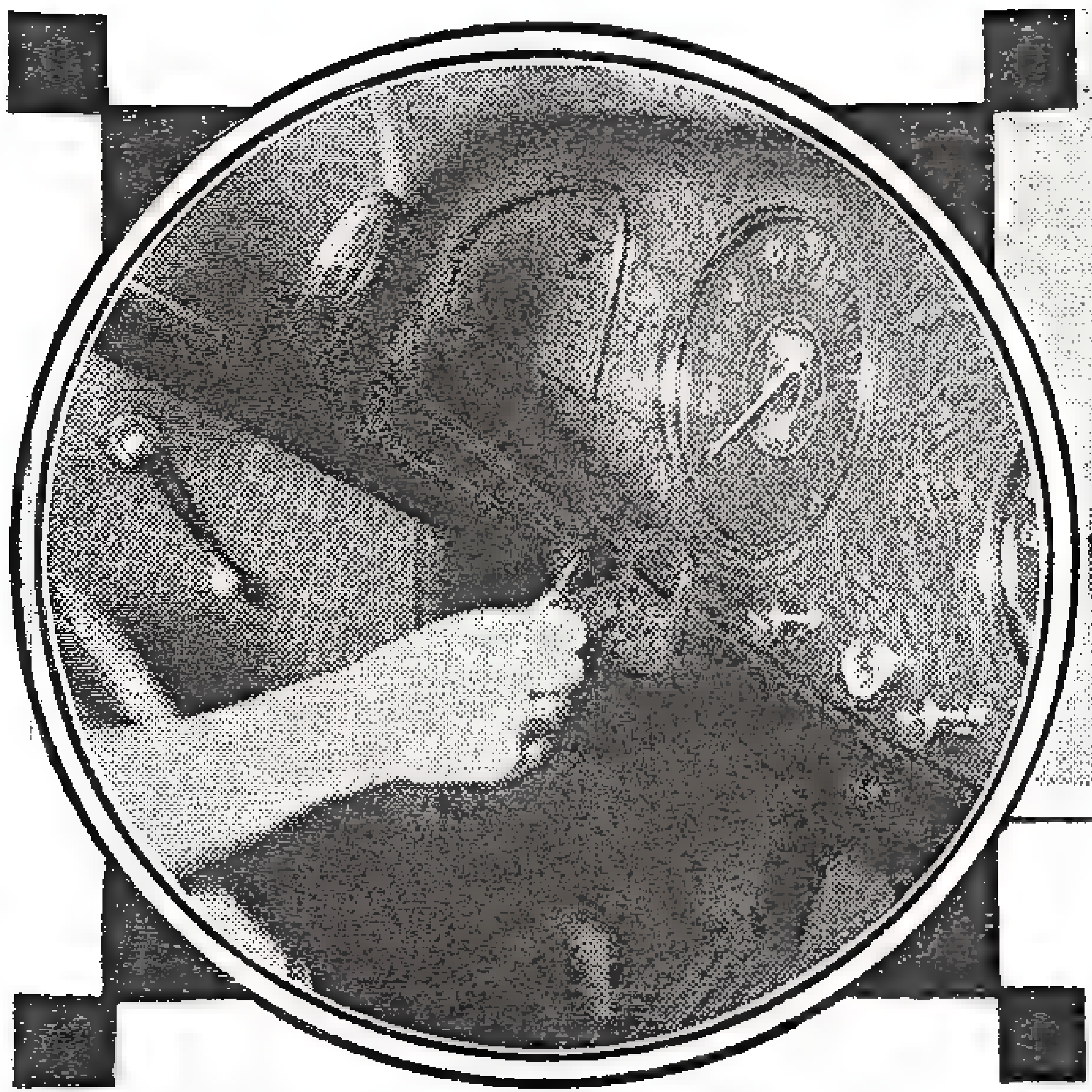
One of the most unique developments for 1935 is the "pancake" truck engine announced by the White Motor Company, a

(Continued on page 128)



Left—How Packard engineers solved the problem of designing louvres in keeping with streamline trends by placing them under the front fender. Note that louvre space is ornamentally treated in the new Packard shown at the right.

Robot Ends Stalled, Frozen Car Danger



When this switch is unlocked, motor robot starts parked car just often enough to keep engine warm. When driver turns ignition key on, engine starts automatically.

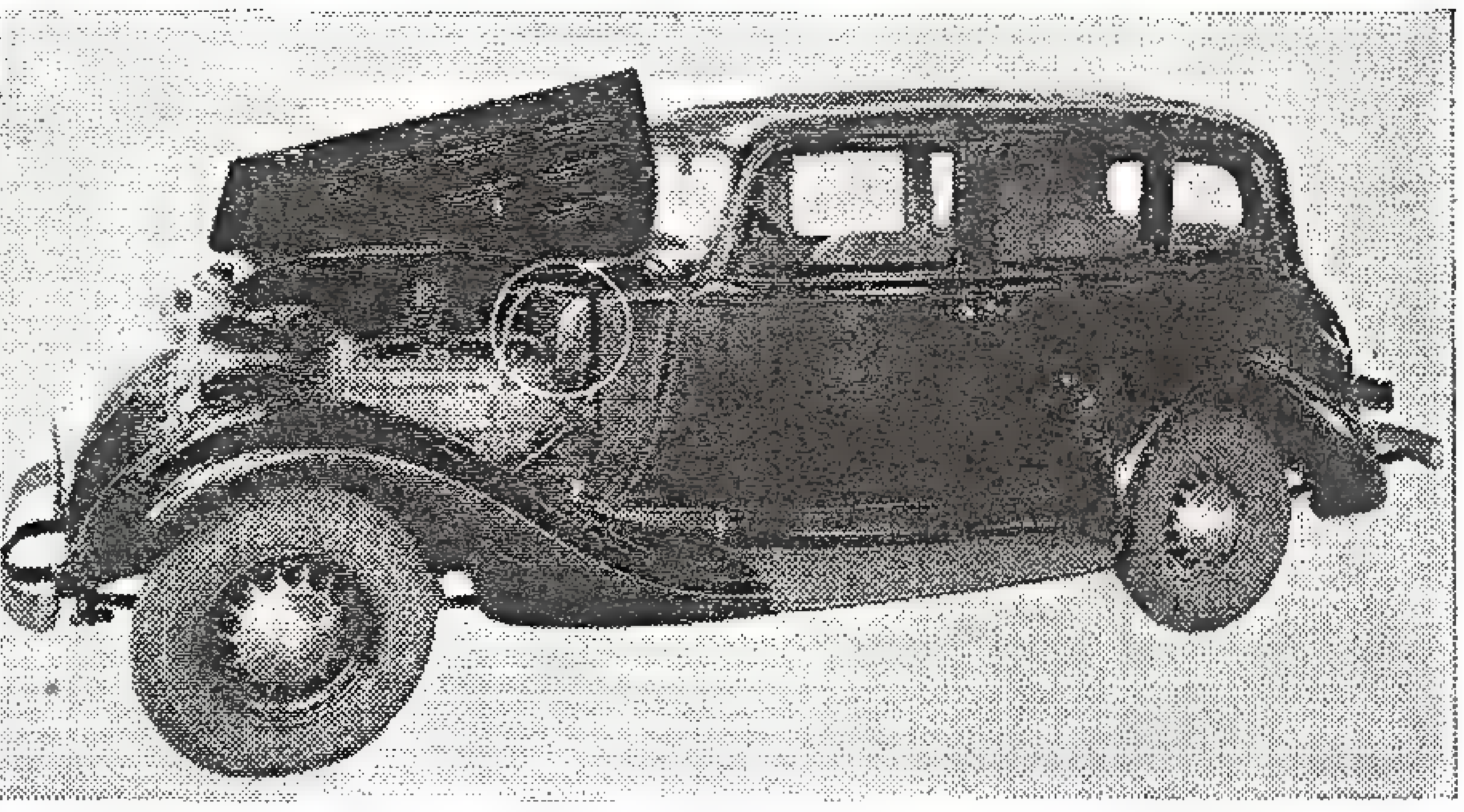


Illustration shows how control box is mounted on dash board under hood of car. Inside is cooling system thermostat, time switch, and starting relay. Robot keeps engine temperature between 120° and 145° Fahrenheit, with heater always warm.

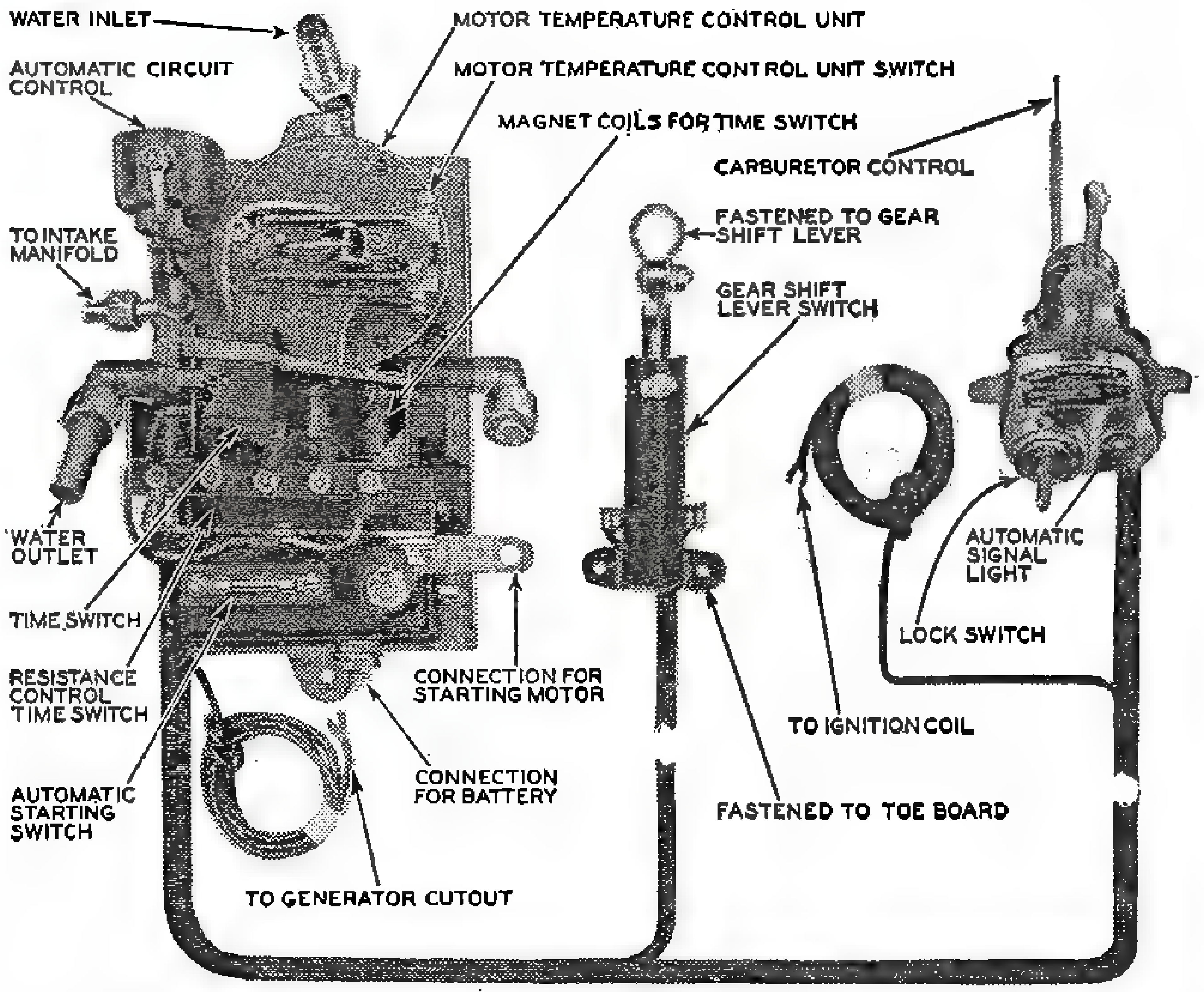

WATER INLET
AUTOMATIC CIRCUIT CONTROL
MOTOR TEMPERATURE CONTROL UNIT
MOTOR TEMPERATURE CONTROL UNIT SWITCH
MAGNET COILS FOR TIME SWITCH
CARBURETOR CONTROL
TO INTAKE MANIFOLD
FASTENED TO GEAR SHIFT LEVER
GEAR SHIFT LEVER SWITCH
WATER OUTLET
AUTOMATIC SIGNAL LIGHT
TIME SWITCH
LOCK SWITCH
RESISTANCE CONTROL TIME SWITCH
CONNECTION FOR STARTING MOTOR
TO IGNITION COIL
AUTOMATIC STARTING SWITCH
CONNECTION FOR BATTERY
FASTENED TO TOE BOARD
TO GENERATOR CUTOUT

Photo shows compactness of motor robot parts. Lock switch at right, operated by key, is fastened on instrument panel of car. Cut-out switch (center) mounts on floor-board, hooks over gear-shift lever. Control box at left, heart of unit, mounts anywhere on dash under hood, connects as shown.

AN ELECTRICAL robot that prevents automobiles from freezing while parked in zero weather is one of the outstanding motor accessories to be placed on the market recently.

With the robot installed on his car the motorist can forget about his parked automobile because the device automatically starts the engine at intervals to keep the cooling system between 120 and 145 degrees Fahrenheit, regardless of the weather. This assures an instant start when the motorist returns, as well as immediate heat from the car heater.

A thermostat connected to the cooling system constantly checks water temperature, closing contacts which operate the starter switch when the temperature drops below 120°. Automatically the throttle is opened just enough to give the maximum charging rate for the generator, and warm the engine. On the average car the motor will usually stand idle from 90 to 95 per cent of the time, making the cost of fuel used less than two cents an hour.

A cut-out switch attached to the gear shift lever prevents starting of the motor if the car has been left in gear. It instantly shuts off the motor if the gear shift lever is shifted out of the neutral position, thus preventing accidents and theft.

The regular car starter button is not needed, for this new robot switch automatically starts the engine as soon as the ignition key is turned on. If stalled in traffic, the engine is re-started without touching a single lever.

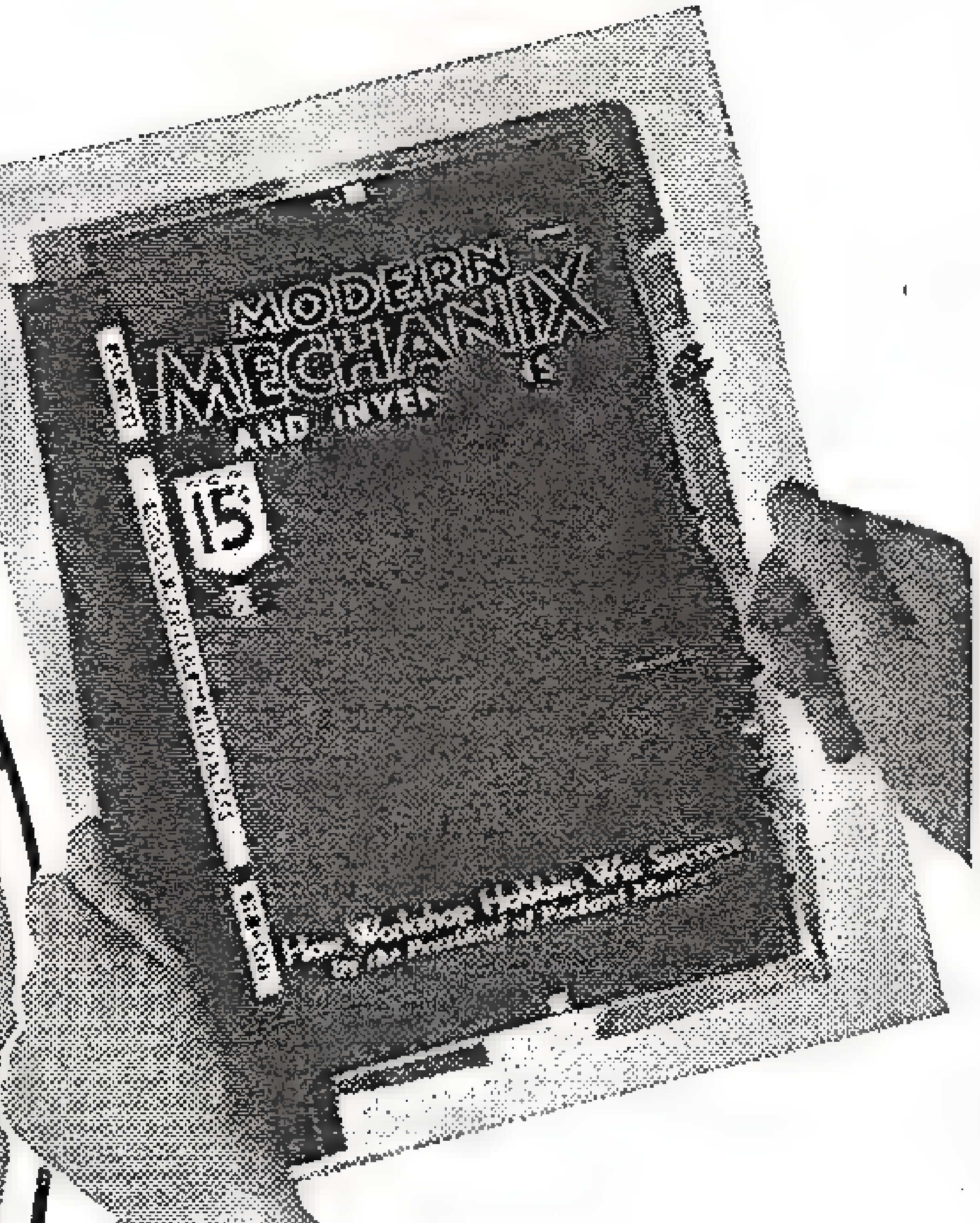
Should the car run out of gas or for any other reason refuse to start, an automatic cutout operates after a definite time interval to shut off the starter before the battery is discharged.

By slipping a length of flexible metal tubing over the exhaust pipe of the car, and running this outside, the motor robot may be safely used in private garages. Oftentimes the carbon monoxide gas produced by the car will escape fast enough through a partly-opened garage window.

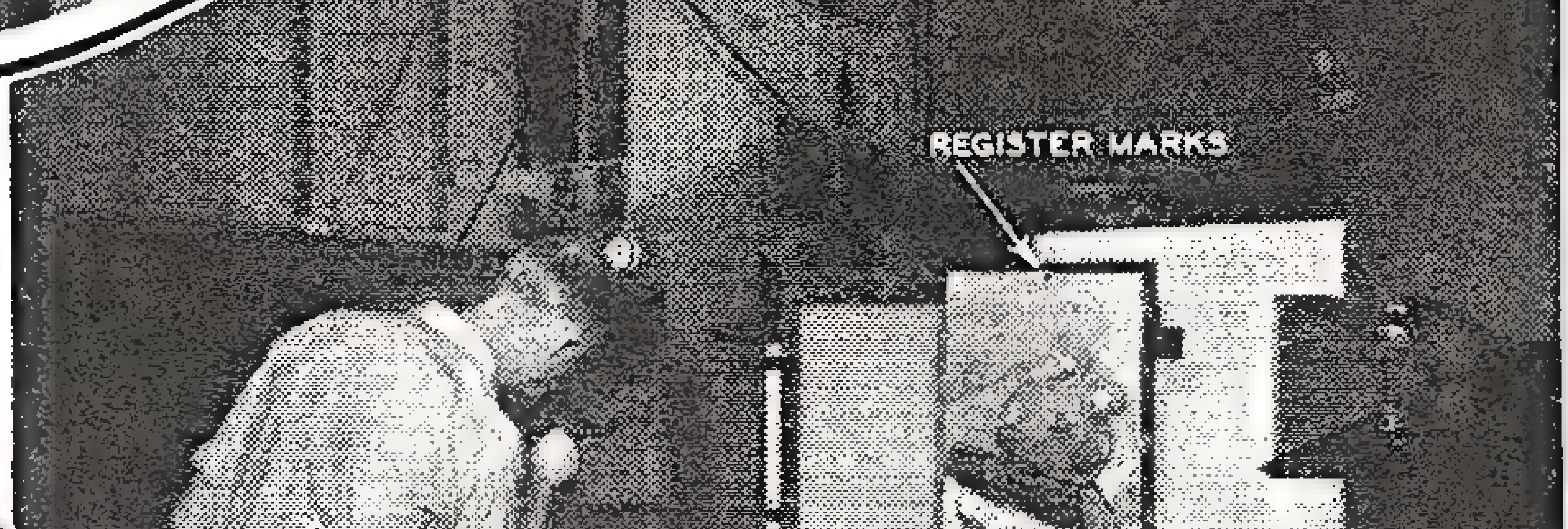
Since most of the installation work involves only changes in the electrical wiring, the entire set-up is readily transferable from one car to another. Special fittings are available for each make of auto.

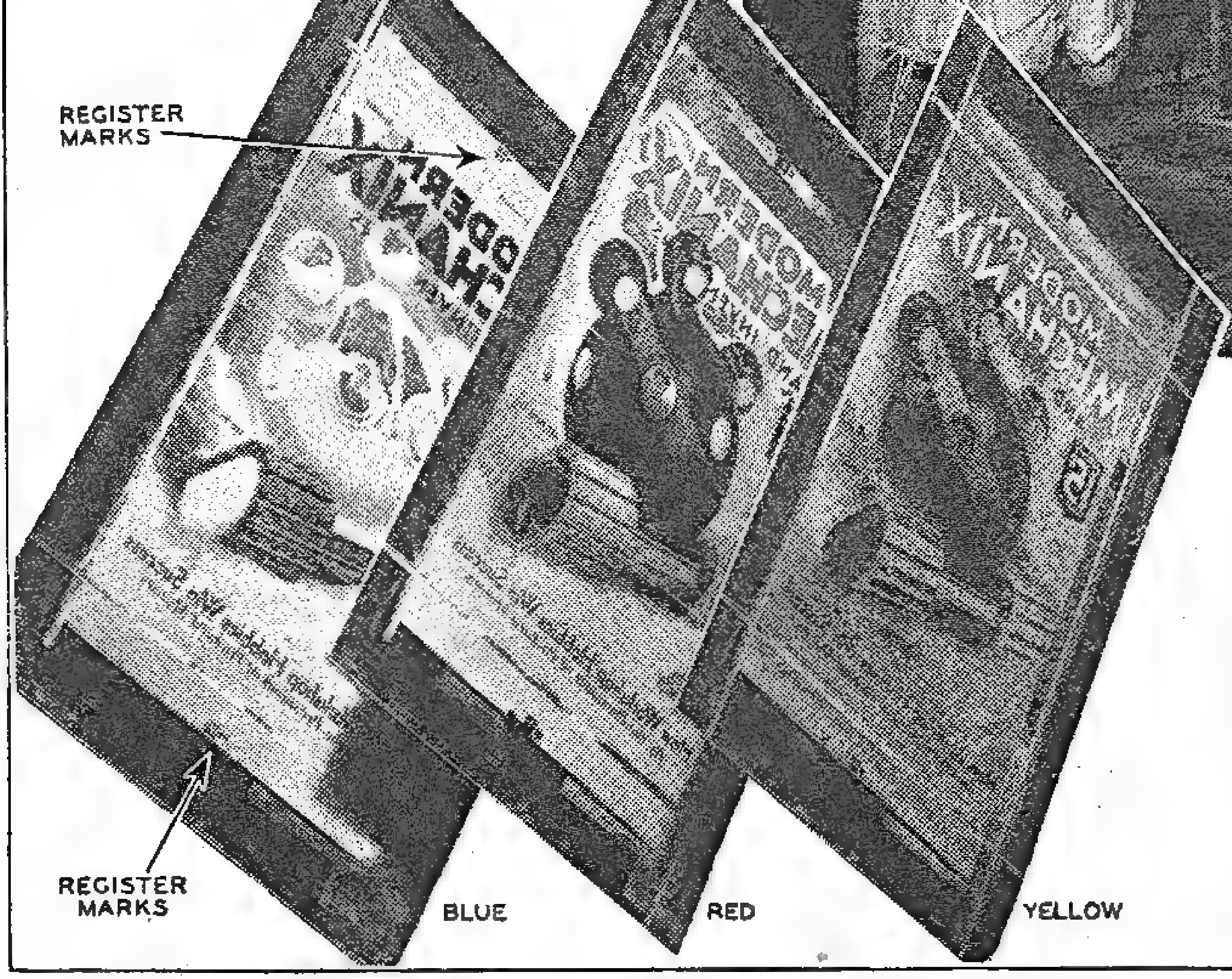
MM'S Cover from Painting to Magazine

George Rozen, MM's cover artist, makes an outline of this month's cover from a sketch supplied by the editor. He makes a small color rough to get tone values, then completes oil painting.


MODERN
MECHANIX
AND INVEN
15
How Workshop Hobbies Win Success

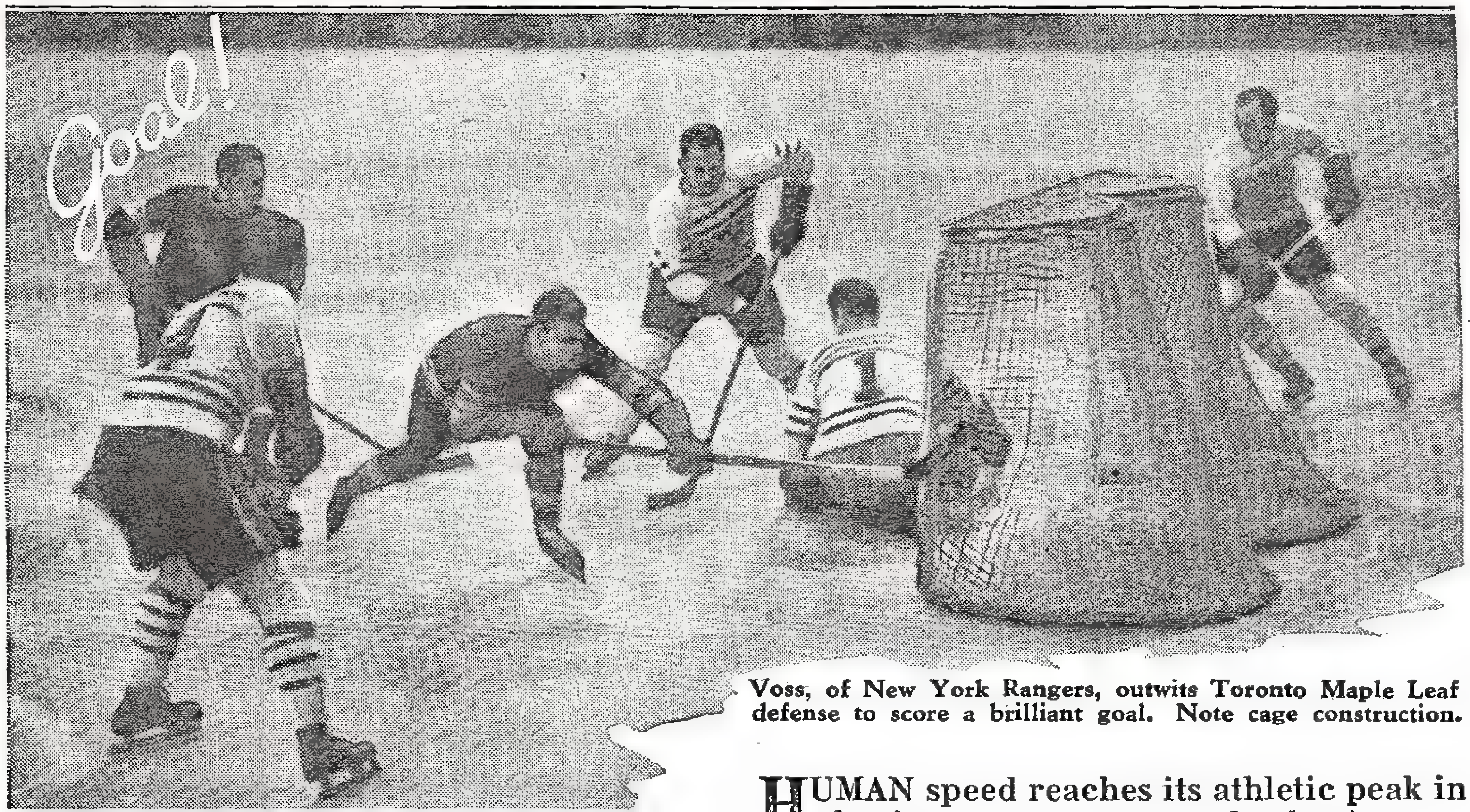
Three photo negatives are made of 21"x30" oil painting (below). At same time screen of 133 dots to inch is placed between plate and lens. On one negative all but blue color is filtered out, second all but red, and third yellow. Proof of type for the cover is photographed. Type on negative is masked for drawing (above).


REGISTER MARKS

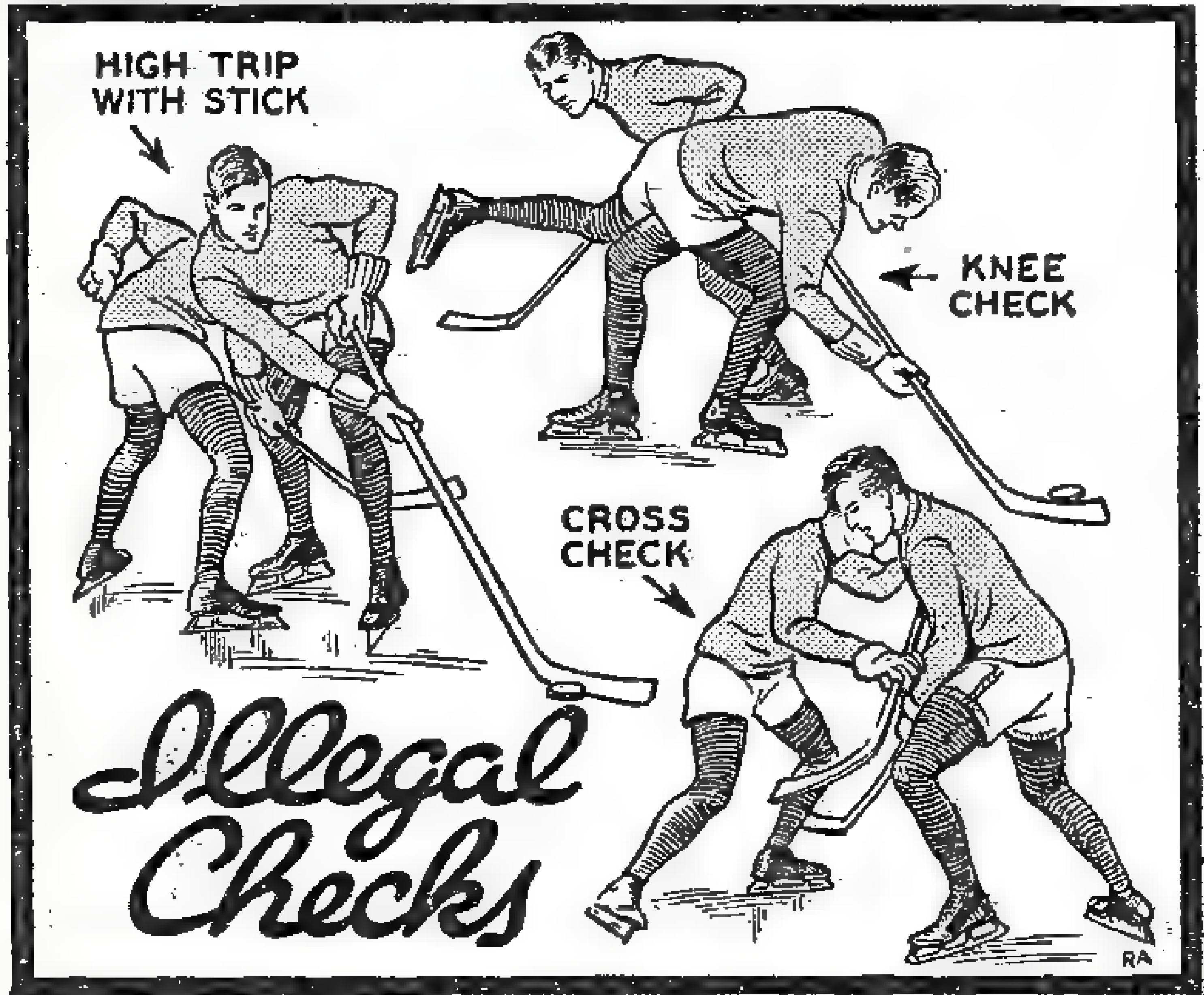

REGISTER MARKS
REGISTER MARKS
BLUE
RED
YELLOW

Three color plates (left) each of which makes a separate color impression on finished cover are needed. Photo print is made on copper plate of type, over which red negative is superimposed for red plate. Plate is etched, acid eating metal where there is little or no red. Shading is obtained by varying size of screen dots. Use magnifying glass on cover to see these. Black is obtained by piling three colors on top of each other. Register marks line up plates for proofs. Electrotypes for presses are then made from lead mold of copper plates for the actual printing.

ANALYZING HOCKEY–



Voss, of New York Rangers, outwits Toronto Maple Leaf defense to score a brilliant goal. Note cage construction.

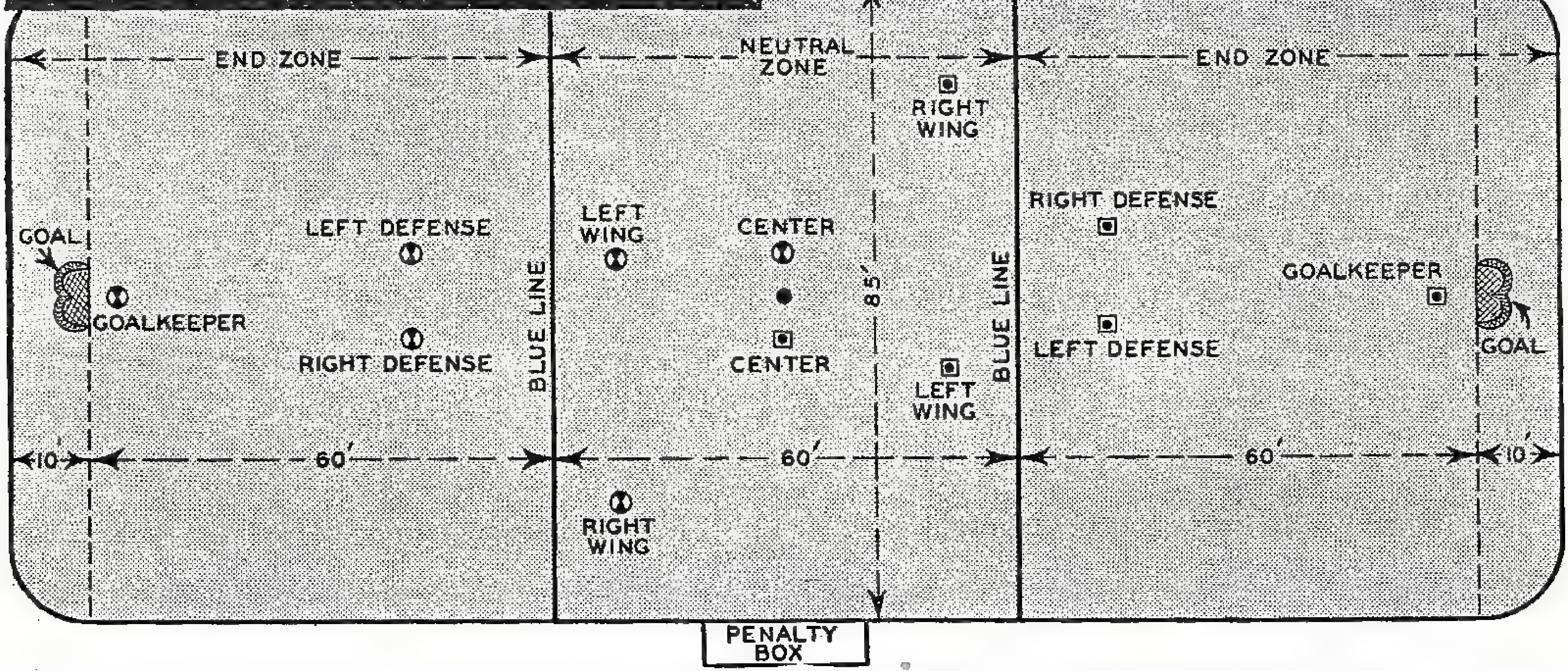

HIGH TRIP WITH STICK
KNEE CHECK
CROSS CHECK
Illegal Checks
RA

HUMAN speed reaches its athletic peak in the fastest game on earth—hockey.

No other sport even remotely approaches it in tempo. For hockey is a game of human meteors on bladed lightning—a dazzling spectacle of split-second thrills, almost too fast for ordinary eyes to follow.

Any hockey spectator knows that the object of the game is to put the puck into the enemy's goal. How and why it gets there is generally a mystery to the uninitiated. With this in mind, we shall go behind the scenes and see just what it is that makes the game click.

Hockey, of course, is played by six-man


PLAYERS BOXES
END ZONE
NEUTRAL ZONE
END ZONE
RIGHT WING
GOAL
LEFT DEFENSE
LEFT WING
CENTER
RIGHT DEFENSE
GOALKEEPER
GOALKEEPER
RIGHT DEFENSE
BLUE LINE
CENTER
85'
BLUE LINE
LEFT DEFENSE
GOAL
LEFT WING
10'
60'
60'
60'
10'
RIGHT WING
PENALTY BOX

Drawing shows general layout of hockey rink with positions of players at the face-off which begins each period. The insert of the skating figures shows three common fouls which cause removal from game for a given time.

FASTEST Game on Earth

by JOHN C. HOFFMAN

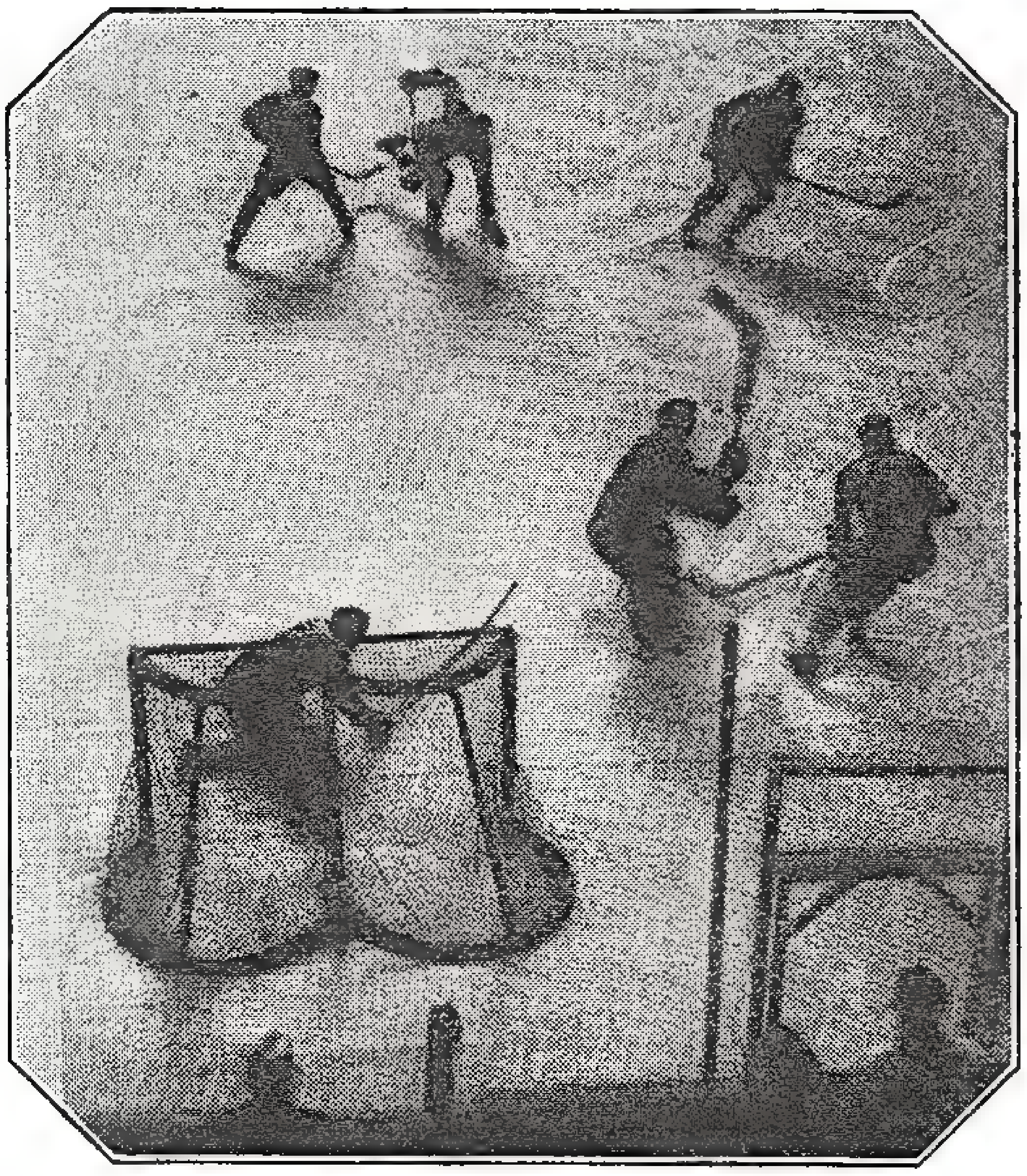
teams on sheets of ice commonly known as rinks. When games are played indoors—the general custom in the United States—the measurements of the rink may be regulated by the size of the building; but in general the playing surface is 200 feet long and 85 feet wide. A wooden fence, 4½ feet high and preferably white in color, surrounds the arena.

The goals are located from 10 to 15 feet from the ends of the rink and in the center of a line drawn across the ice. The goal posts are set 6 feet apart with a red line—the official goal line—connecting them. Back of the goal line, of course, is a netted cage to catch the puck.

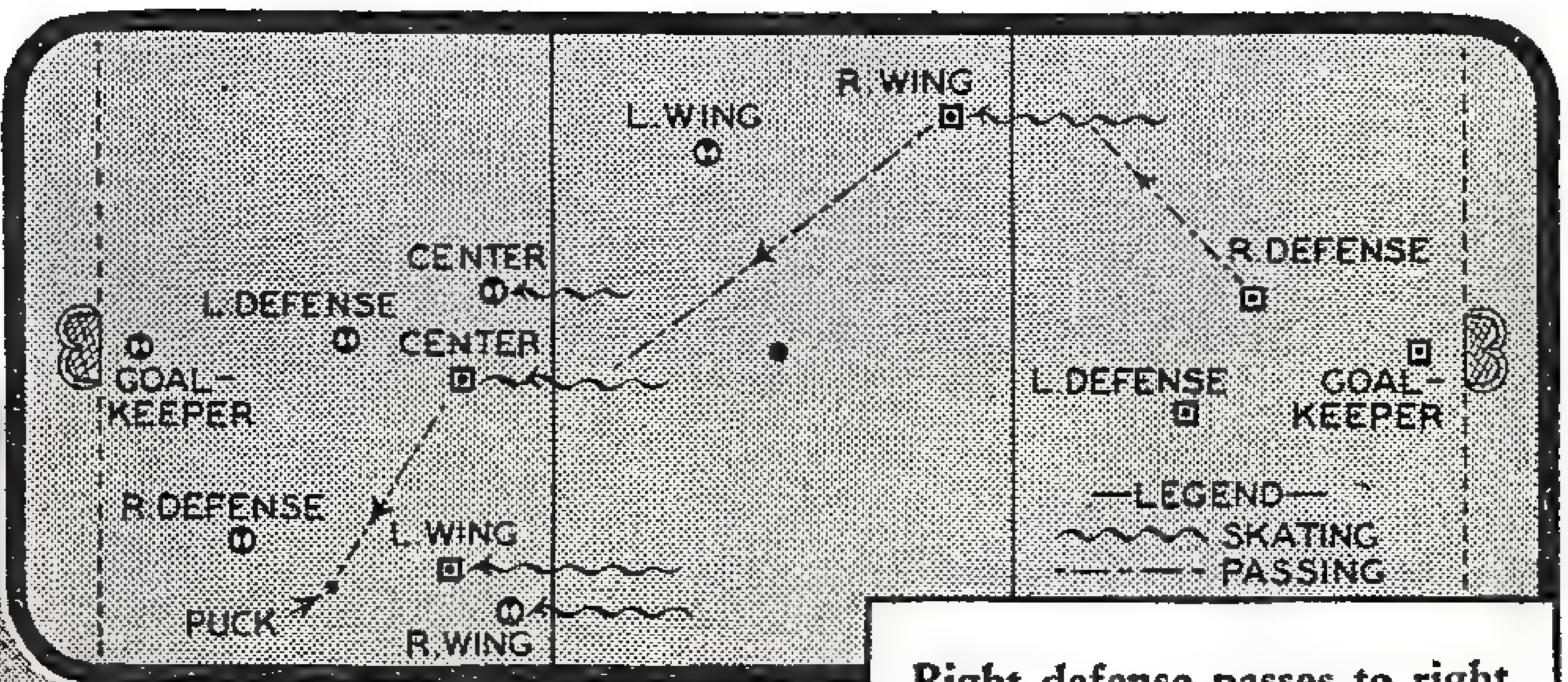
The ice area between the two goals is divided into three sections by a blue strip extending across the rink, 60 feet out from the goal lines. The center section is known as the neutral zone and the end zones are variously known as "defensive" or "attacking" zones.

The six men who comprise the team are known as goalie, center, left and right wings and

(Continued on page 137)



Note that goalie (with uplifted stick) has left cage in this thrilling skirmish, to check the enemy's scoring drive.



Right defense passes to right wing who skates across zone line and passes to center. Latter skates toward goal, suddenly passes to the left wing who has entered the end zone with puck movement—a typical pass play.

Charlie Gardiner, late goalie of the Chicago Blackhawks, has just checked a vicious enemy drive. Arrow points to puck as it struck Gardiner's body. Note heavy trappings necessary for protection against the mile-a-minute pucks.

Scientist Builds 38-Foot Model Showing Moon's Surface

Roger Hayward (foreground) is shown at work on his model of the moon. In background another worker studies moon photographs through magnifying glass for proper contours.

A REMARKABLE addition to the new Griffith Observatory in Los Angeles will be a 38-foot model of the moon constructed by Roger Hayward, architectural designer and prominent amateur astronomer.

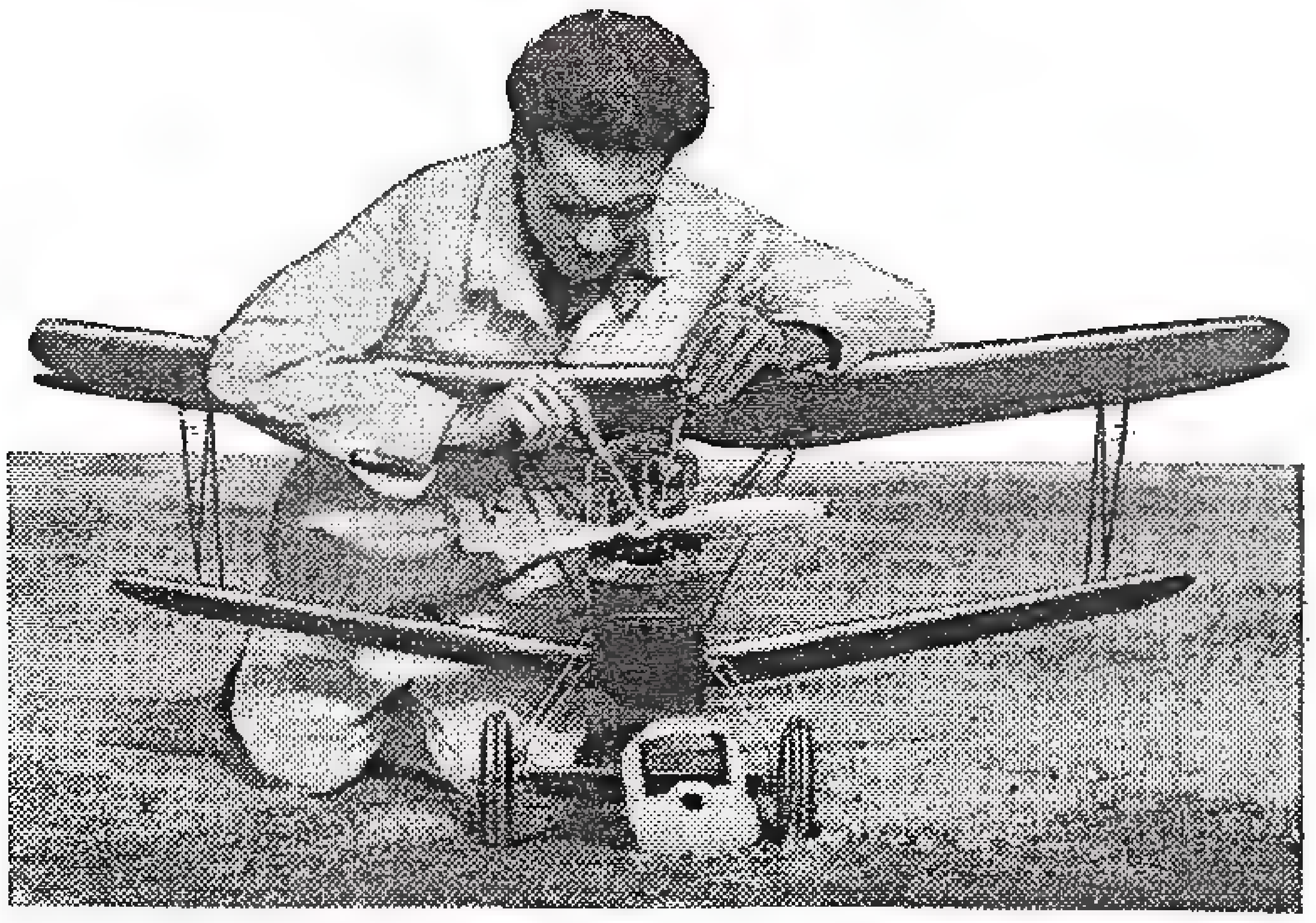
Three and a half months were required to make the original model from which plaster molds were made, a section at a time. When these sections are joined and installed in the Observatory, the huge model will give the observer the illusion of looking down upon the moon from a space ship hovering about 600 feet above its surface.

The model was built from Royal Astronomical Society data, supplemented by pictures made through the 100-inch Mt. Wilson telescope.

Gas Engine Powers Model Plane

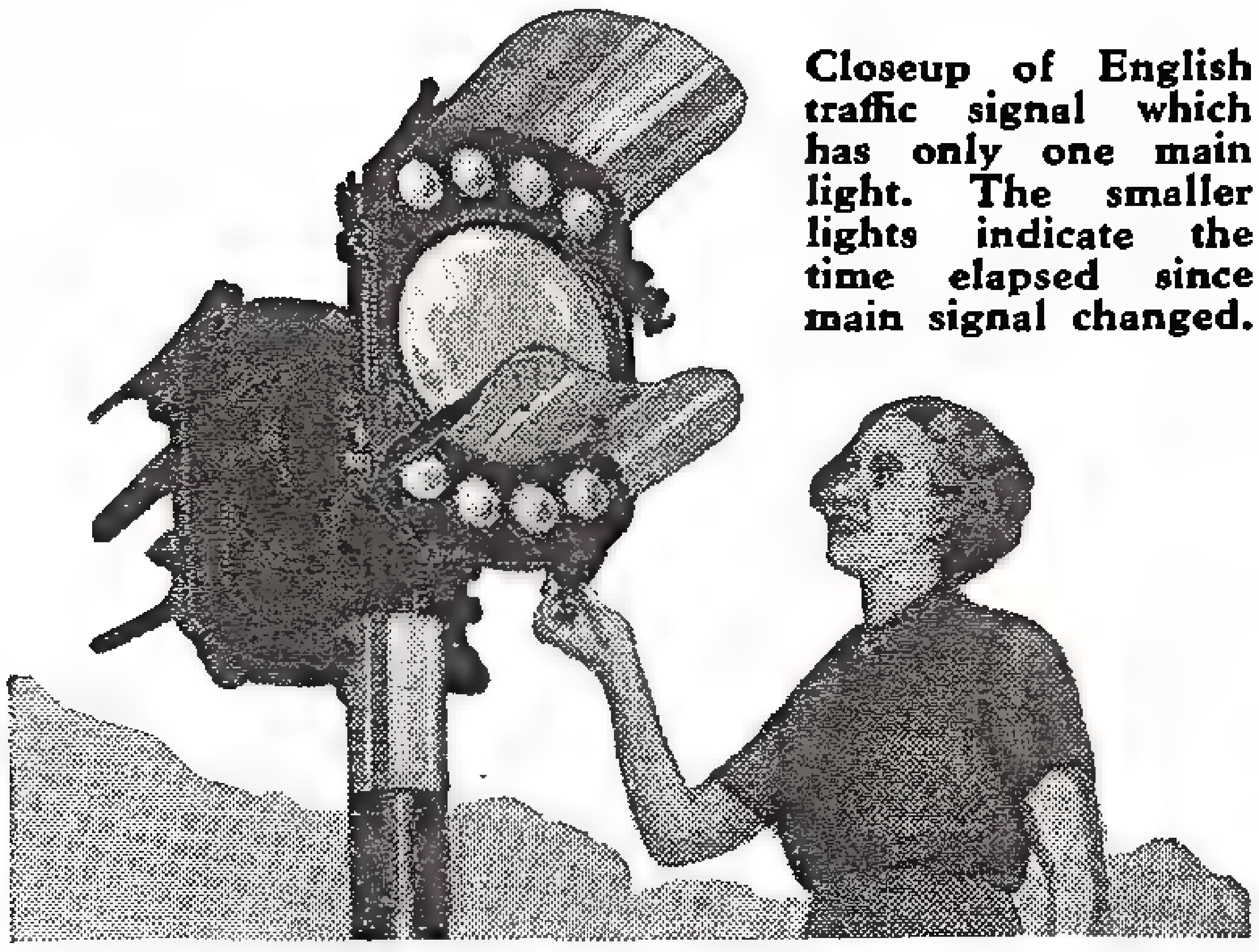
STRINGENT Department of Commerce regulations have grounded many amateur flyers; but Wallace McDowell, Los Angeles, California, has succeeded in putting a plane into the air which supplies most of the thrills of flying with none of its hazards.

The ship is a combination job, too small for a passenger but considerably larger than the usual model plane. The craft measures 4 feet in length and has a wing spread of 5 feet. Power is supplied by a miniature gasoline motor which propels the tiny plane through the air at a speed of 25 m.p.h. for 12 minutes. The model weighs 3½ pounds.



Wallace McDowell makes mechanical adjustments on the motor of his model plane, preparatory to a takeoff.

English Improve Traffic Signals

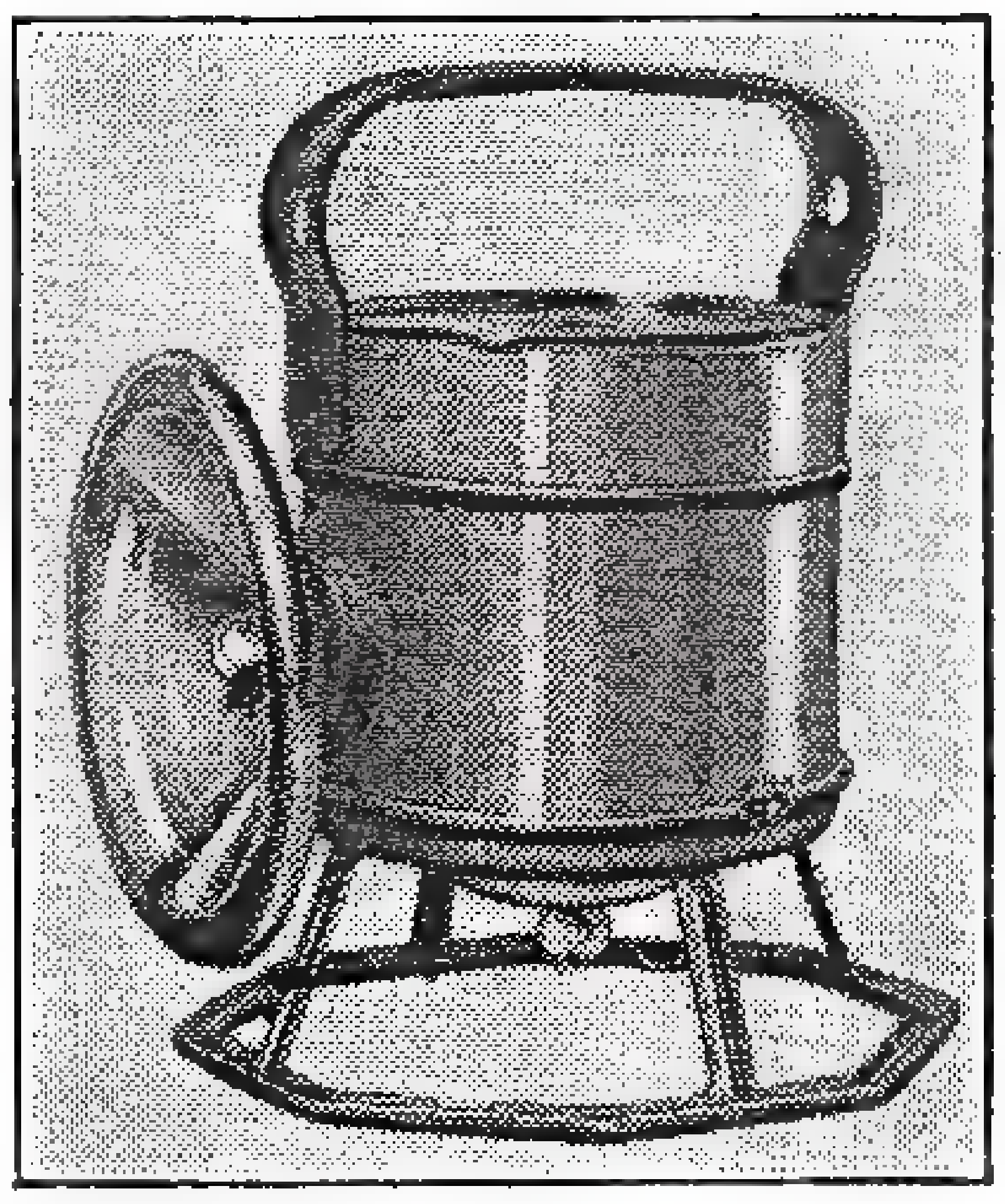


Closeup of English traffic signal which has only one main light. The smaller lights indicate the time elapsed since main signal changed.

HAILED as a vast improvement over the old systems, a new English traffic light has only one main signal for the alternate showings of red, green and amber. A series of four smaller lights is extinguished in rotation to show how much time has expired since the last change of the main signal.

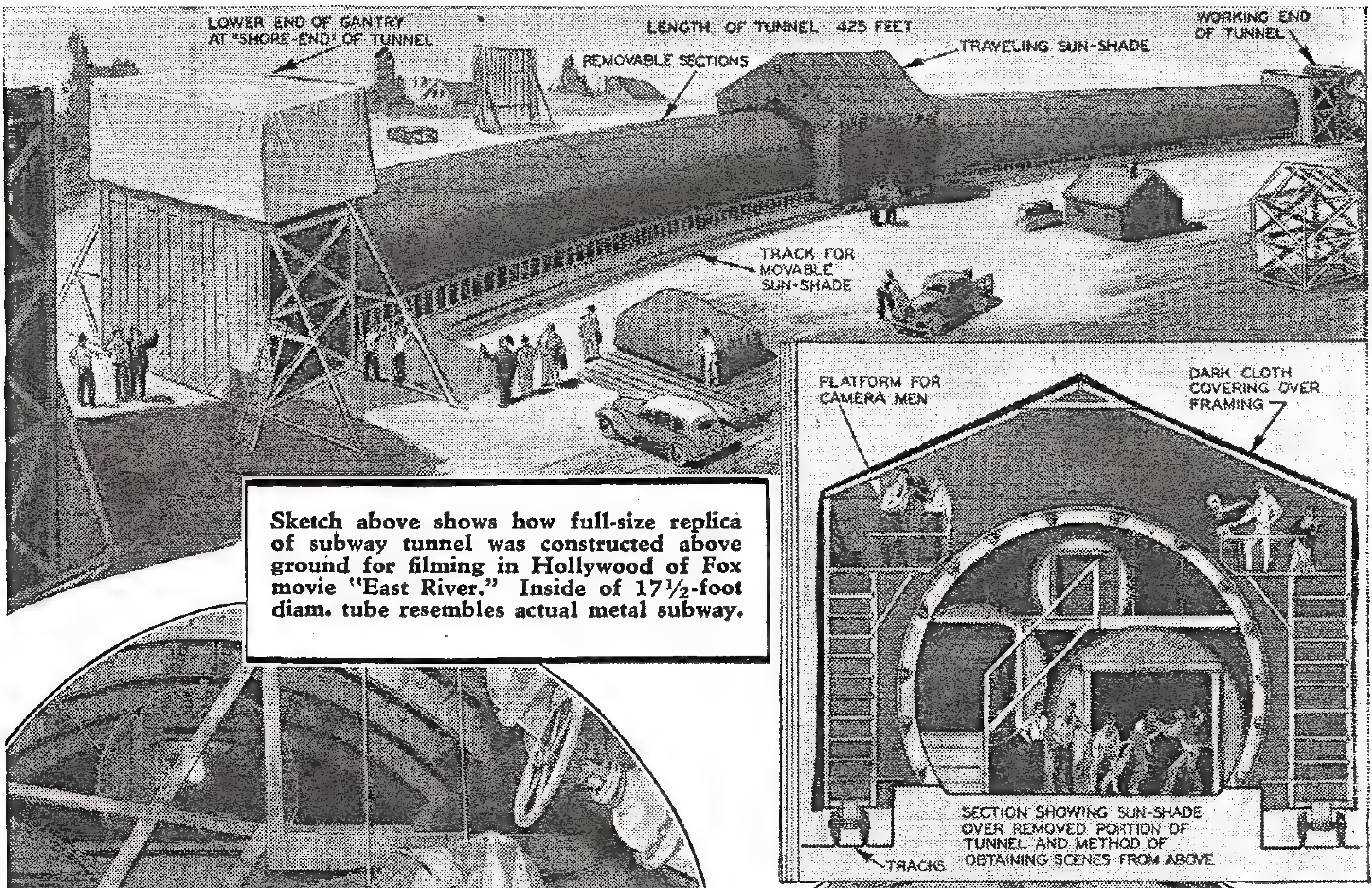
Hand Lamp Has Twin Reflectors

ONE of the outstanding features of a new electric hand lamp is its two-reflector construction, affording a spot beam in front and a floodlight at the bottom. Either light is brought into instant use by a flip of the convenient double-acting switch.

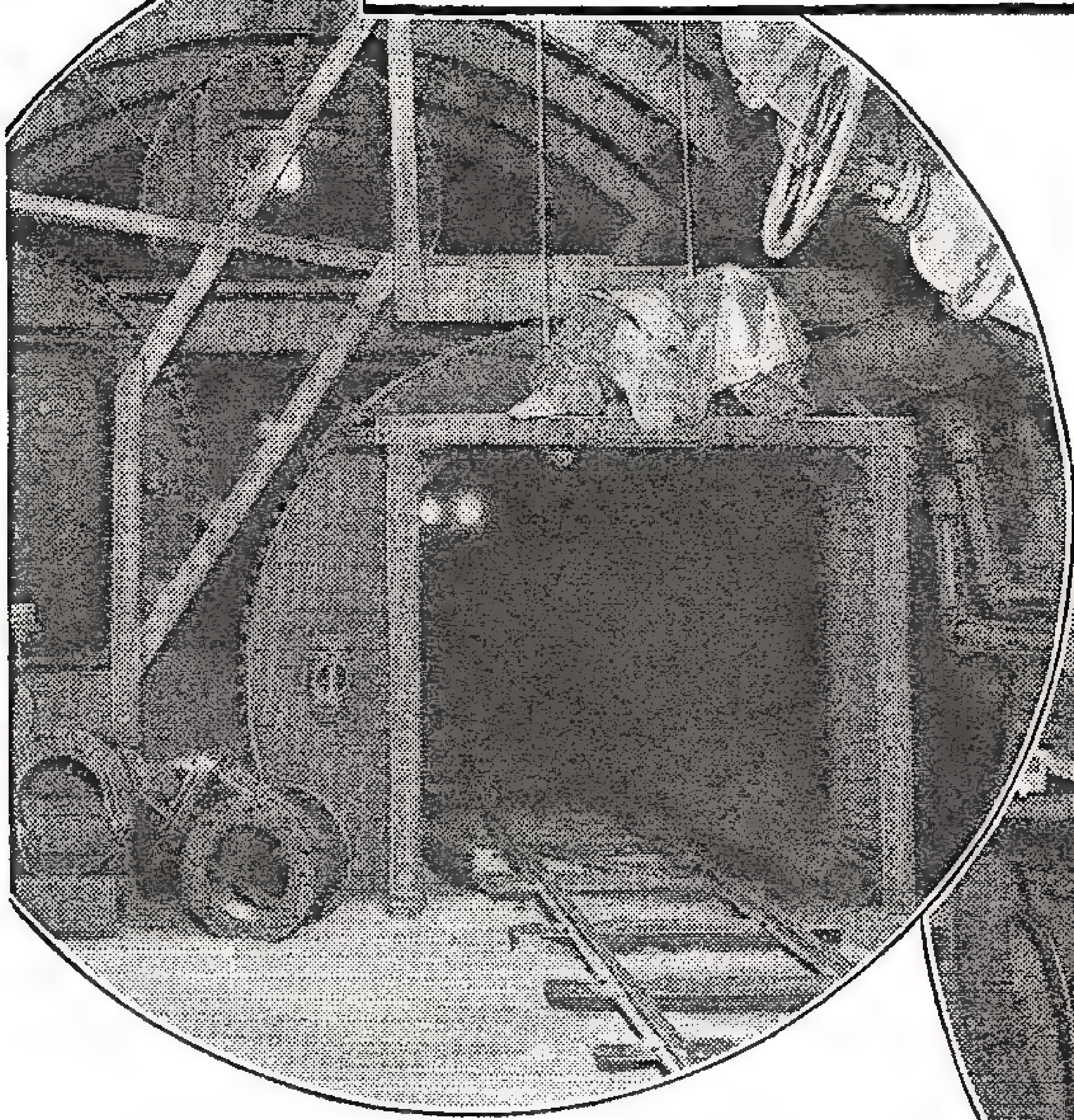


Note twin bulbs, top and bottom, giving spot beam and floodlight.

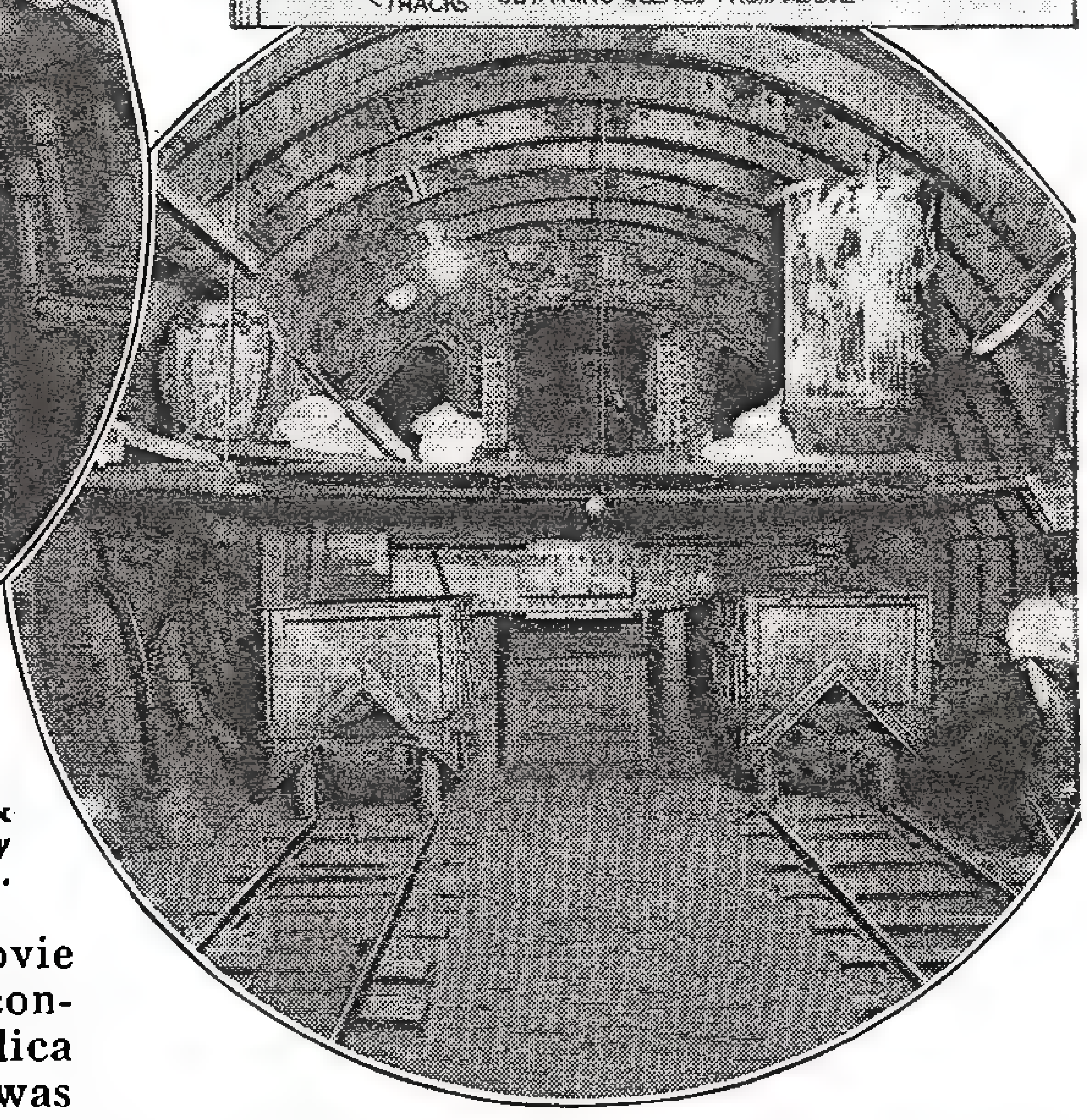
Movie Filmed in Above-Ground "Subway"


LOWER END OF GANTRY AT "SHORE-END" OF TUNNEL
LENGTH OF TUNNEL 425 FEET
WORKING END OF TUNNEL
REMOVABLE SECTIONS
TRAVELING SUN-SHADE
TRACK FOR MOVABLE SUN-SHADE
PLATFORM FOR CAMERA MEN
DARK CLOTH COVERING OVER FRAMING
TRACKS
SECTION SHOWING SUN-SHADE OVER REMOVED PORTION OF TUNNEL AND METHOD OF OBTAINING SCENES FROM ABOVE

Sketch above shows how full-size replica of subway tunnel was constructed above ground for filming in Hollywood of Fox movie "East River." Inside of 17½-foot diam. tube resembles actual metal subway.



Looking into tunnel tube from "shore-end". Car lock is at right, entrance lock for workers at left; emergency lock for use when tunnel is flooded is seen at top.



Working end of tunnel, with hydraulic rams which push cutting shield ahead showing just above platform. Equipment was brought directly from New York tunnel job.

IN FILMING "East River," the first movie ever to show under-water tunnel construction scenes, a gigantic full-size replica of an actual 17½-foot diameter tunnel was erected above ground in Hollywood by Fox Studios.

Though the "tunnel" itself is constructed of wood, the interior, perfect in every detail, gives the impression of a metal subway perhaps a hundred feet below the surface of the river.

Regular equipment brought from New York tunnel jobs is used at the "working-end" of the movie tunnel, where powerful hydraulic rams push the cutting shield into the river-bottom muck.

The effect of water and mud oozing in between seams was obtained by spattering a special paint over the tunnel interior.

In filming action scenes, sections of the tunnel were removed and a traveling sun-shade rolled into position, to get the proper focus for the cameras.

Building World's Largest

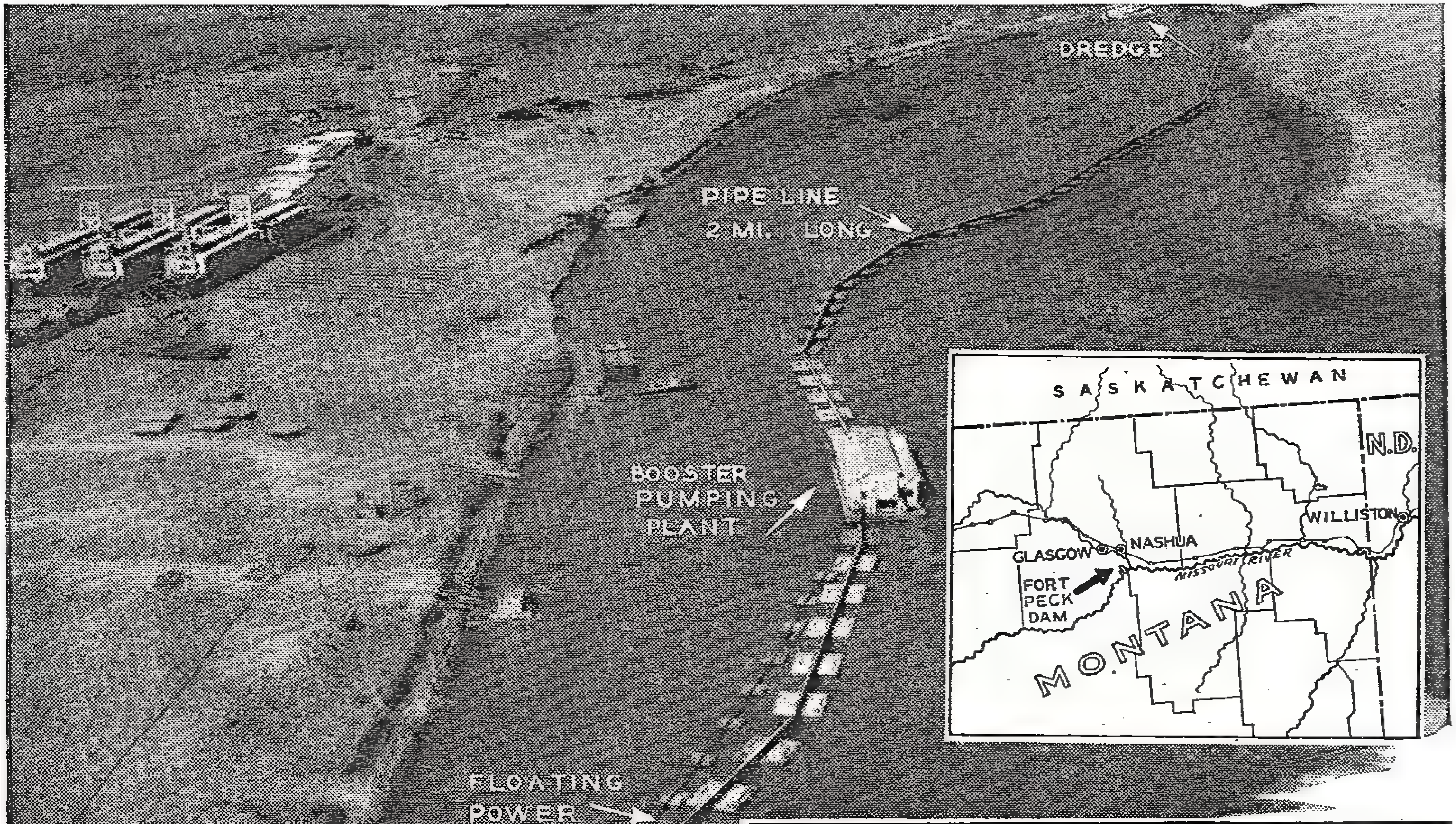
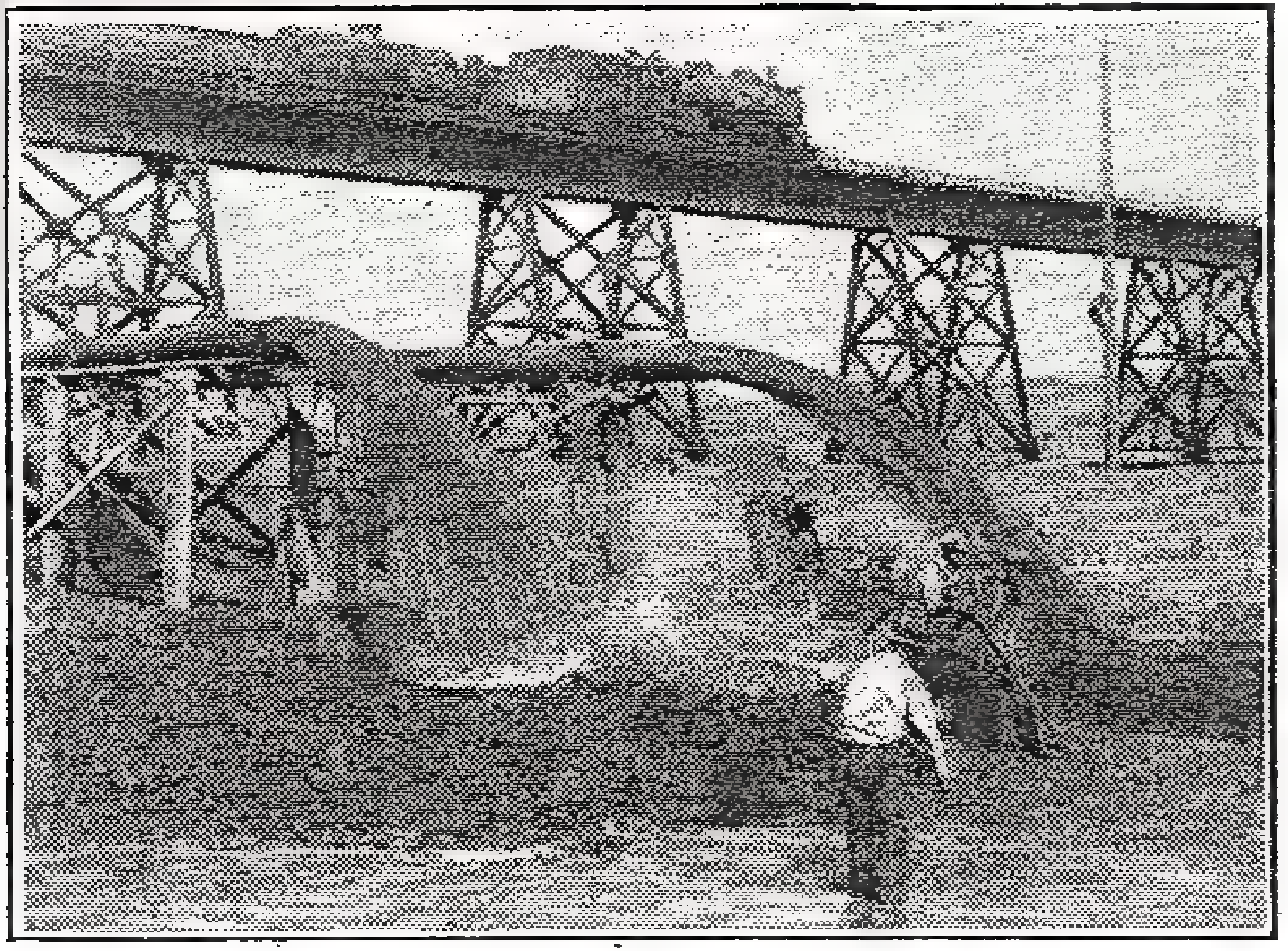


Photo shows one of four units which will pump 90,000,000 cu. yds. of earth into Fort Peck dam. Three other dredges are under construction, upper left. Smaller pontoons support 154,000 volt power line from Great Falls, Montana.



Four years hence this bridge will disappear as dam rises, filled by earth from a battery of 28-inch pipes as shown above. Map insert shows location of the mammoth project.

At a point in eastern Montana where crowding bluffs force the winding Missouri river through a natural bottleneck, army engineers are engaged in one of the most gigantic projects of modern times—the building of the Fort Peck Dam, largest earth fill barrier in the world.

Not even Boulder Dam, Titan of the Southwest, eclipses the Fort Peck structure for sheer magnitude. For when the massive earthen wall is completed, the rampaging Missouri will be held in check by a mighty barrier almost four miles long.

From a sturdy base measuring 2677 feet from upstream to downstream toe, the twin slopes of the dam proper will rise 231 feet above the river bed to form the dam's crest, 100 feet wide. Across the main channel, engineers are throwing a main fill 8500 feet wide, to join a low dam, or dike which will march 11,000 feet up the west bank, for a total length of 19,500 feet.

The most unusual feature of the $72,000,000 project is the choice of construction material. A 3-foot facing of concrete and rip-rap will protect the upstream slope, but the main body of the dam will be composed of earth fill—90,000,000 cubic yards of it, which will be pumped into position by a battery of dredges.

Held in check by this mighty wall of earth and stone will be a giant reservoir, 175 miles long and 16 miles wide. This huge lake will flood a district of about 380 square miles—250,000 acres—to a maximum depth of 230 feet. Boasting a shoreline of about 2500 miles, the Fort Peck reservoir will impound the staggering total of 20,000,000 acre feet of water, an amount which

(Continued on page 140)

Earth Fill Dam

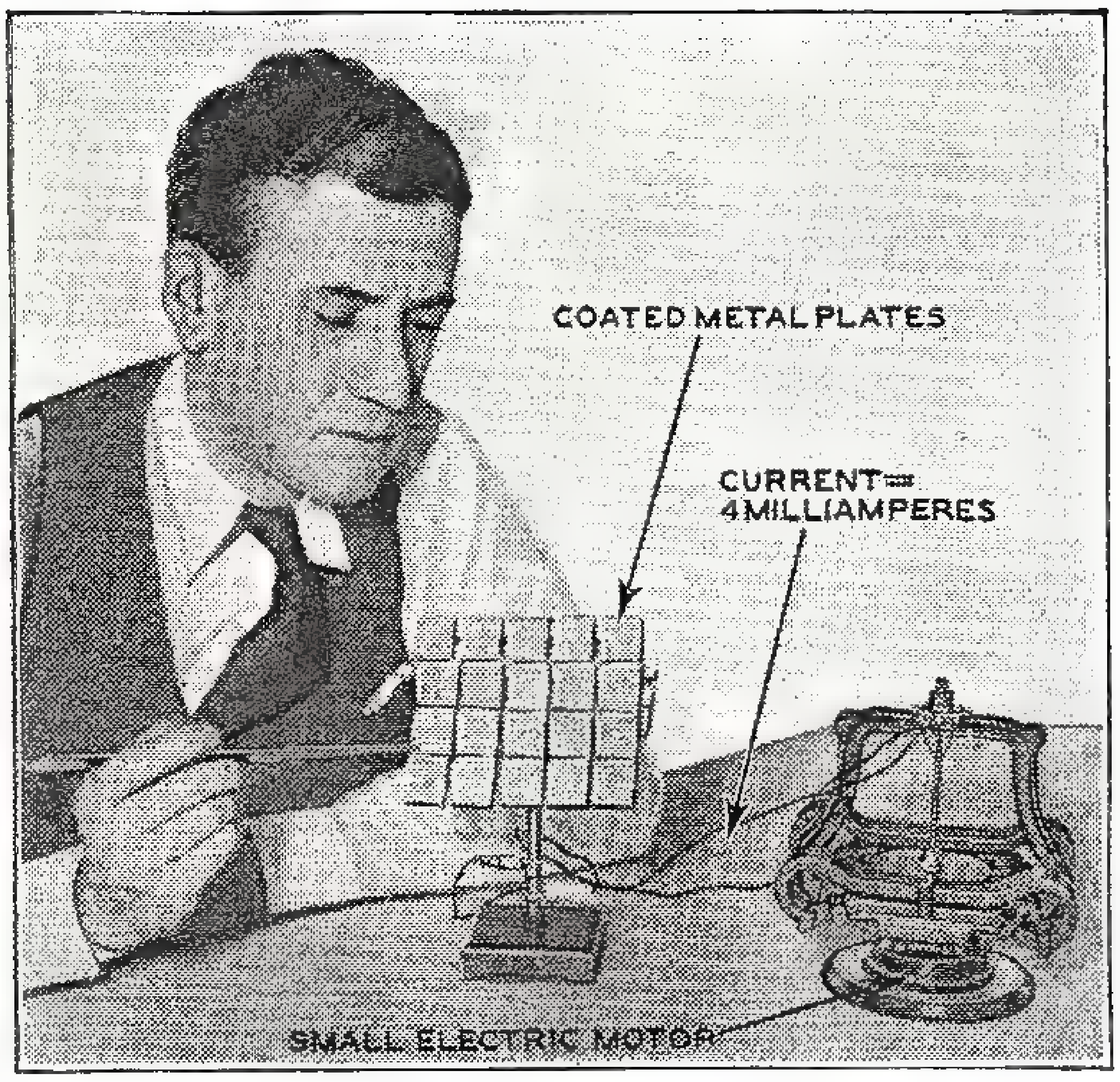
IMPOUNDED WATERS WOULD MAKE RIVER TO THE MOON 69 FT. WIDE,
11,000 FT. DIKE EXTENDS DAM TO TOTAL LENGTH OF 19,500 FEET
RESERVOIR 175 MILES LONG AND 16 MILES WIDE HAS 2,500 MILE SHORE LINE, HOLDS 20,000,000 ACRE FEET OF WATER
8,500 FT.
MAIN FILL
CROSS-SECTION OF DIVERSION TUNNEL
CONCRETE 9 IN.
26 FT.
STEEL 1 IN.
GROUT 6 IN.
CONCRETE 24 IN.
UPSTREAM FACE PROTECTED BY 3 FT. OF RIP-RAP
100 FT.
DIVERSION TUNNEL INTAKE
FINE EARTH CORE
867 FT.
STEEL PILING TO PREVENT SEEPAGE
1,610 FT.
CONTROL TOWER REGULATES FLOW OF IMPOUNDED WATER
DIVERSION TUNNEL OUTLET
20,000 MILE TRAIN
90,000,000 CU. YDS. OF EARTH REQUIRED FOR THE DAM WOULD FILL R.R. GONDOLA CARS REACHING 4/5 AROUND THE WORLD
595 FT. 1/8 IN.
TOTAL MATERIAL USED WOULD BUILD 110 WASHINGTON MONUMENTS
RA

Some idea of the amount of water impounded by the dam is shown in the sketch above.

This cutaway view shows construction features of dam. Note that water is routed around the dam through four huge diversion tunnels.

rial to Fort Peck dam site.
9,000,000 tons of mate-
Railroad will transport

Sun's Rays, Changed Into Electricity, Drive Small Motor



J. Thomas Rhamstine points out photo-electric plates used in his miniature solar power plant. Sun's rays striking the 20 squares generate current of 4 milliamperes, enough to run the midget electric motor shown at right. Oxide coating on face of metal plate converts light to electricity.

THE scientific dream of some day obtaining power for industry from the sun finds realization in a miniature sun-power plant built by J. Thomas Rhamstine, Detroit inventor. Whenever the sun's rays strike a group of twenty photo-sensitive plates, the tiny electric motor connected to these spins merrily away, turned by electrical power obtained directly from sunlight.

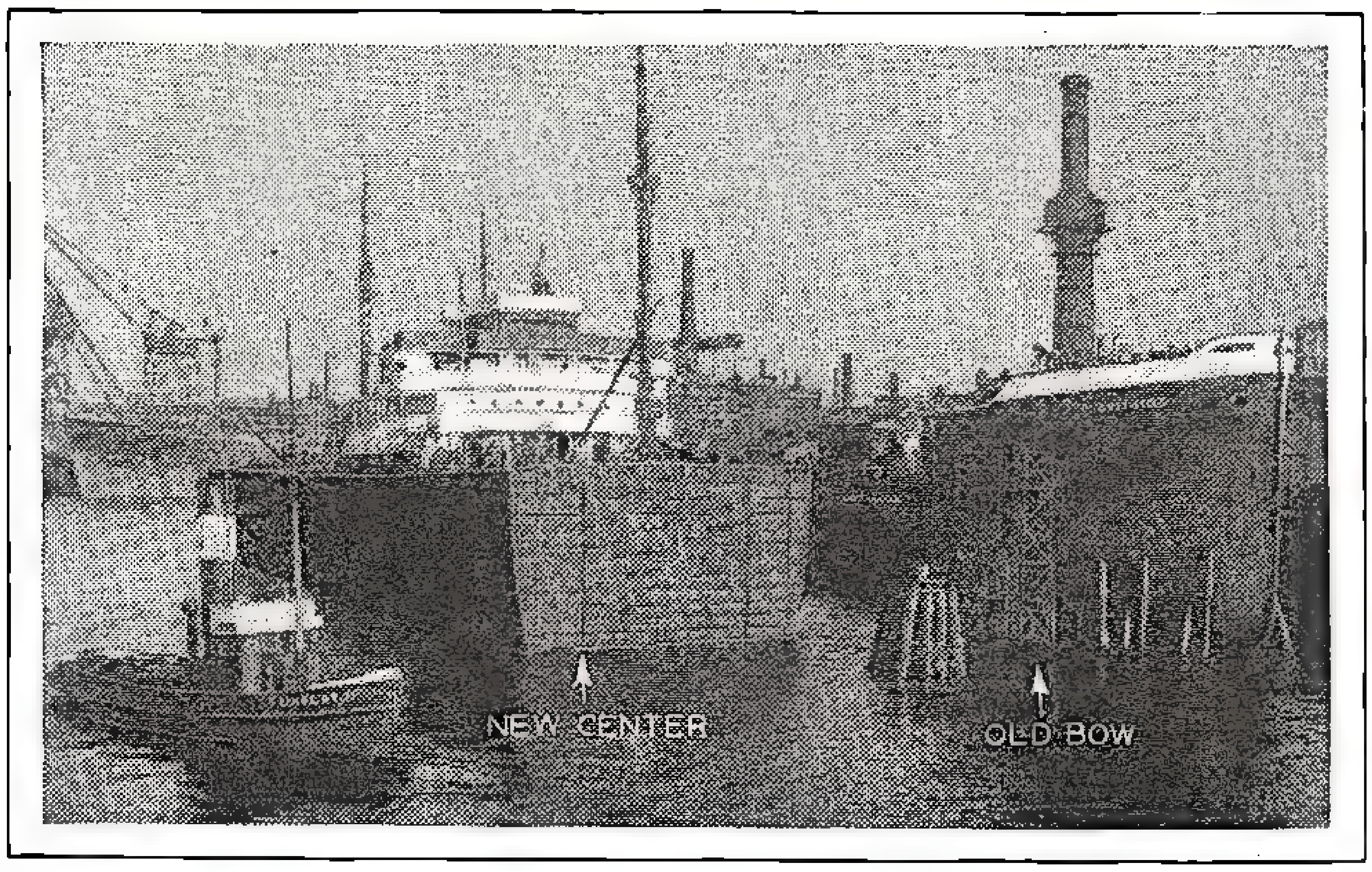
With the series-parallel connection of oxide-coated plates a current of four milliamperes is generated. Rhamstine estimates that a charging current of 18 amperes for a 32-volt farm lighting plant could be obtained with a ten-foot square area of the photo-electric cells.

German Ship Is Spliced Together

A SHIP without bow or stern—just a center section—was launched in Germany recently, then floated into position between the old cut-off end sections of the 10,000 ton tanker *Svithiod.*

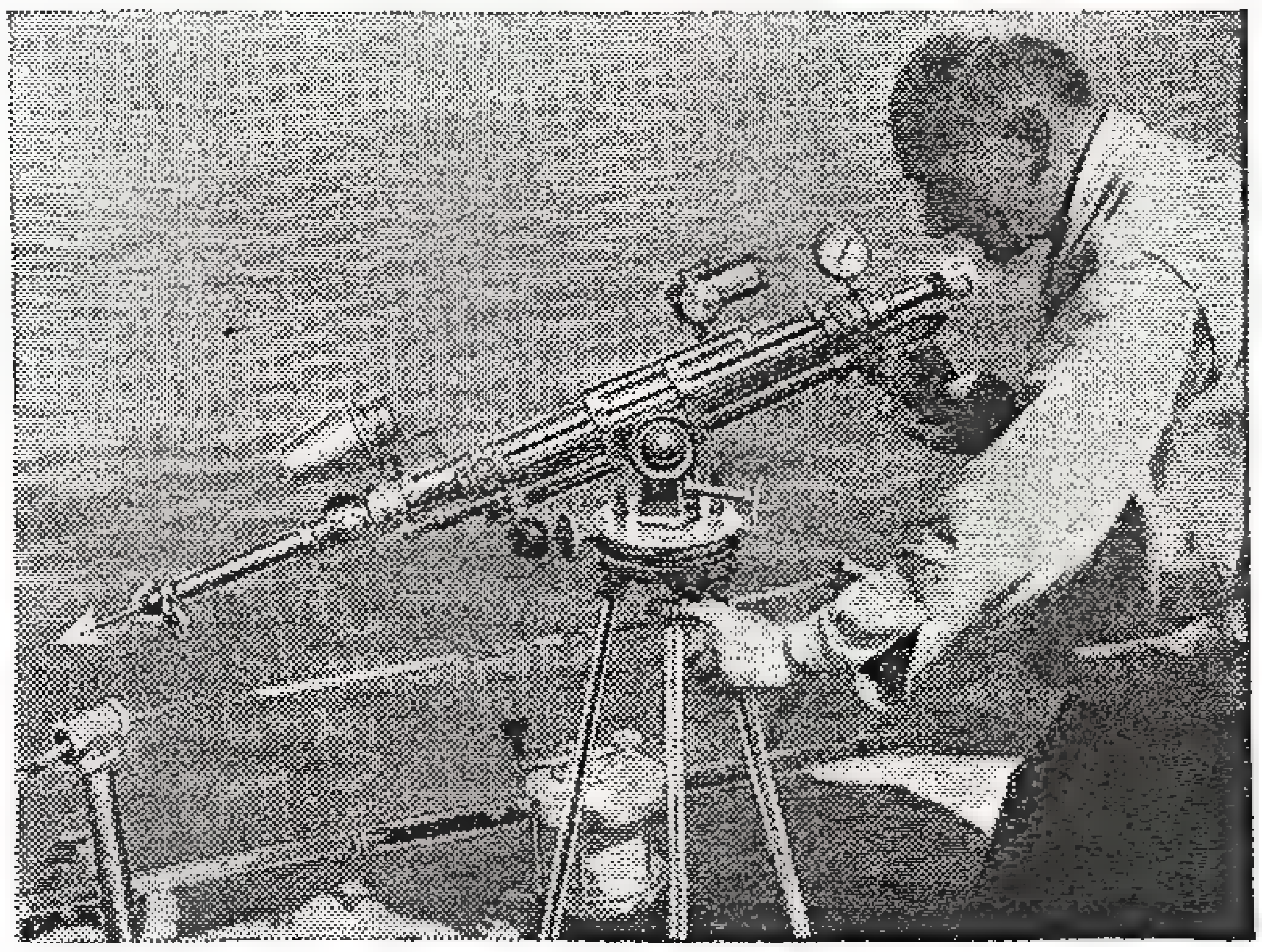
This unusual ship-patching procedure was decided upon after investigation showed the center section of the *Svithiod* to be badly corroded, but the ends still in good condition.

New and old sections of the ship were accurately aligned, then lifted entirely out of the water by a floating drydock and welded together. First trials showed the splicing to be a decided success. With the same engines, the speed was 11 knots an hour, an increase of 1½ knots.



New center for steamer "Svithiod" being floated into position between old bow and stern sections at German shipyard. Parts were welded together after being lifted out of the water by a floating dry dock.

Harpoon Gun Spears Alligators



Harpoon gun just completed by C. R. Klein (above) will throw spear with line attached distance of 150 yards with surprising accuracy. Line is attached to salt-water rod and reel just back of gun, used in landing harpooned fish.

A HARPOON gun intended for the capture of sword fish, alligators, sharks and other large water denizens has just been completed by C. R. Klein, of Santa Monica, California. Operating from compressed air, the device can shoot the harpoon with line attached a distance of 150 yards.

In emergencies the gun may be used by coast guard stations for firing life lines over the surf to disabled vessels.

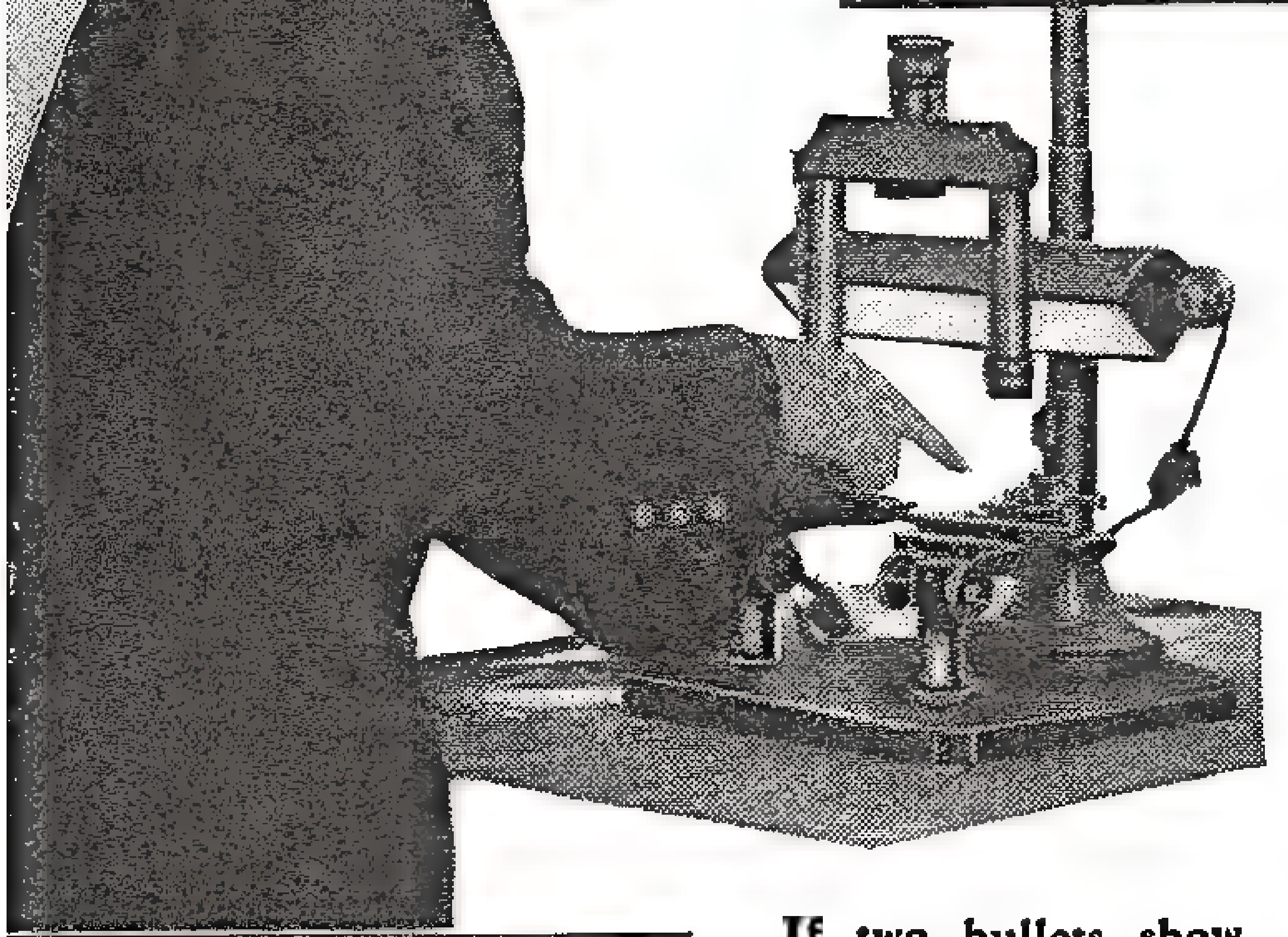
The range of fire may be accurately controlled by a pressure gauge and valve mounted on the gun.

The line is coiled on a reel at the lower end of the firing chamber, its end being led to salt water rod and reel equipment used in playing and landing fish after they are hit.

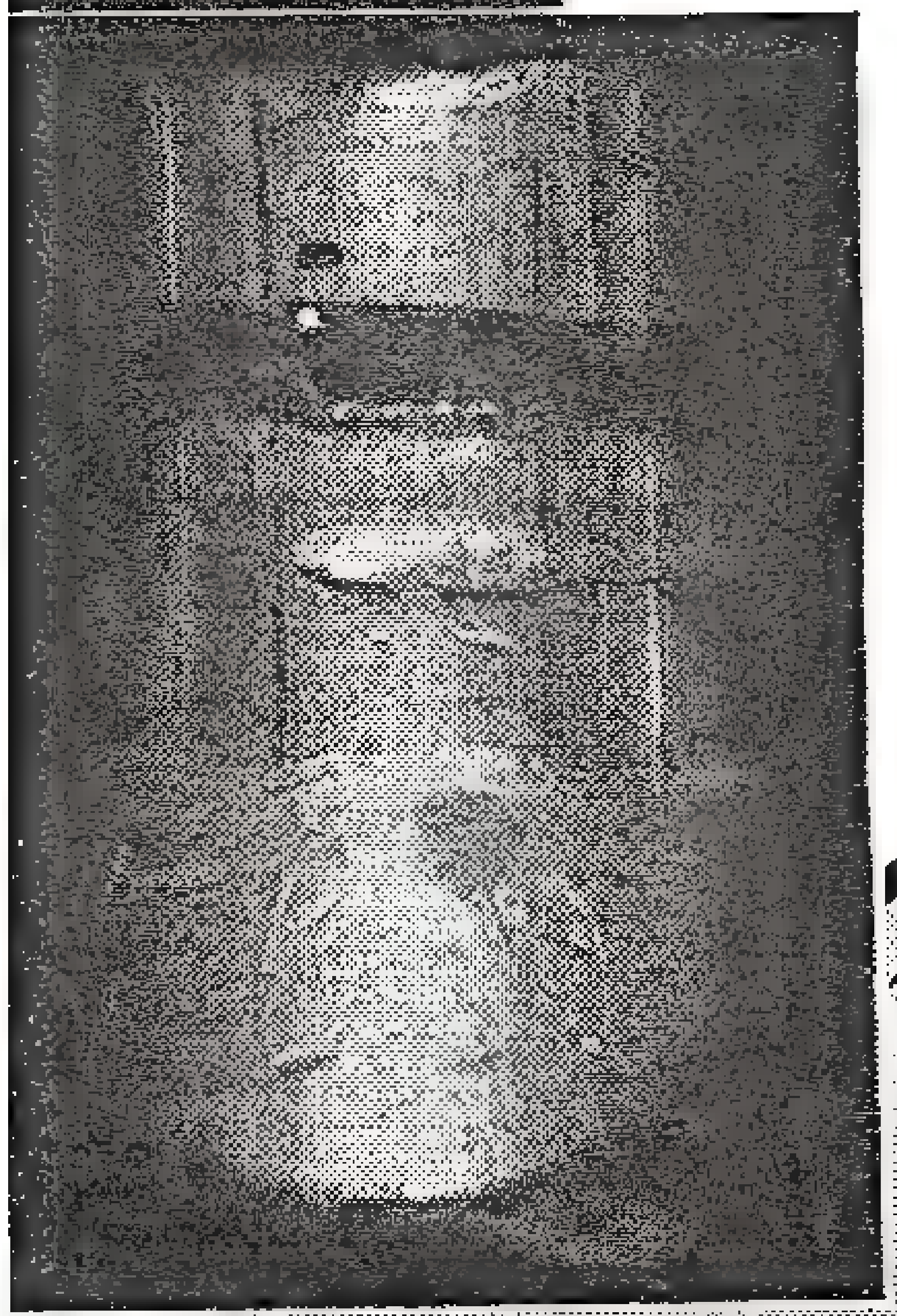
The accuracy of the novel fishing gun is surprisingly good.

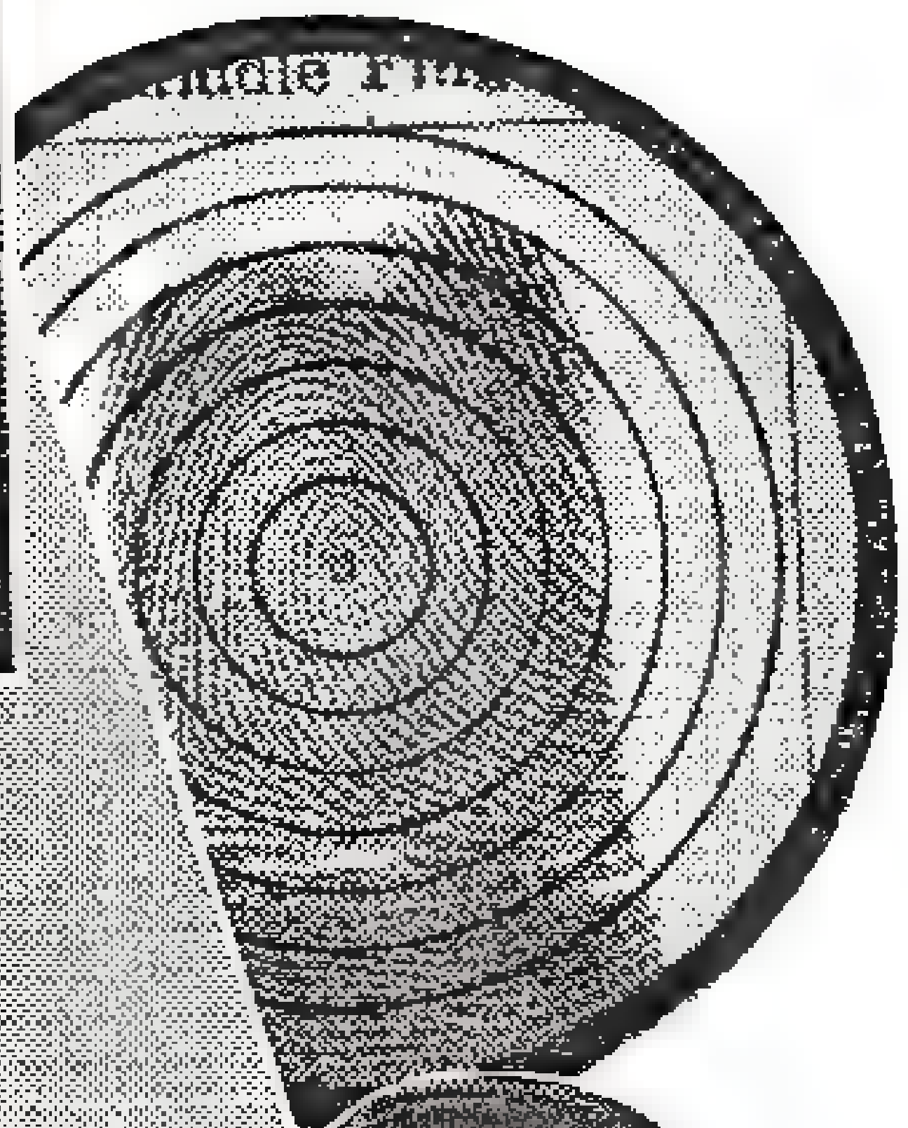
HOW THE MICROSCOPE DETECTS CRIME CLUES

by JULIAN D. CORRINGTON, Ph.D.



If two bullets show identical scratch patterns when studied in comparison microscope pictured above, police know they were fired from same gun. Projectiles are rotated in holders until images, viewed simultaneously and side by side by means of prisms, exactly match.





Fingerprints as well as bullets are studied in comparison microscopes. Photomicrographs of both are shown.

Old stains can in many cases be identified by microscope, even though blood corpuscles have long since disintegrated. Haemin or blood crystals, characteristic of all mammals, become visible under magnification.

SCIENCE'S gift to criminology, the modern high-power microscope, today permits positive identification of three types of clues —fingerprints, bullets and blood stains. Juries everywhere are basing their decisions upon evidence studied through the double-vision comparison microscope, convicting criminals by clues which only a few years ago would have proved worthless.

The tiny ridges covering the tips of our fingers, originally intended by nature to provide a non-slip grasp when man lived entirely by his hands, are arranged in so intricate and varied a pattern that no two people have ever been found with identical fingerprints.

Each Fingerprint Has a Number

Criminologists have classified fingerprint patterns into four main types and many subdivisions, and have given each an arbitrary numerical designation. Each print can thus be described by a group of numbers, permitting rapid location of any fingerprint card in the enormous and elaborate files maintained at principal police headquarters.

Since no two fingers on any person are alike, it is necessary, in making police records, to record the patterns on each. Special cards for this purpose contain spaces for each of the ten fingers.

In taking a fingerprint impression for police records, the ball of the finger is first pressed on a stamp pad or inked glass plate, then placed, left side first, upon the proper space on the card. The finger is then rolled from left to right while pressing with moderate force. This act must be done in one rapid motion and the finger lifted straight up at the end, to prevent smudging.

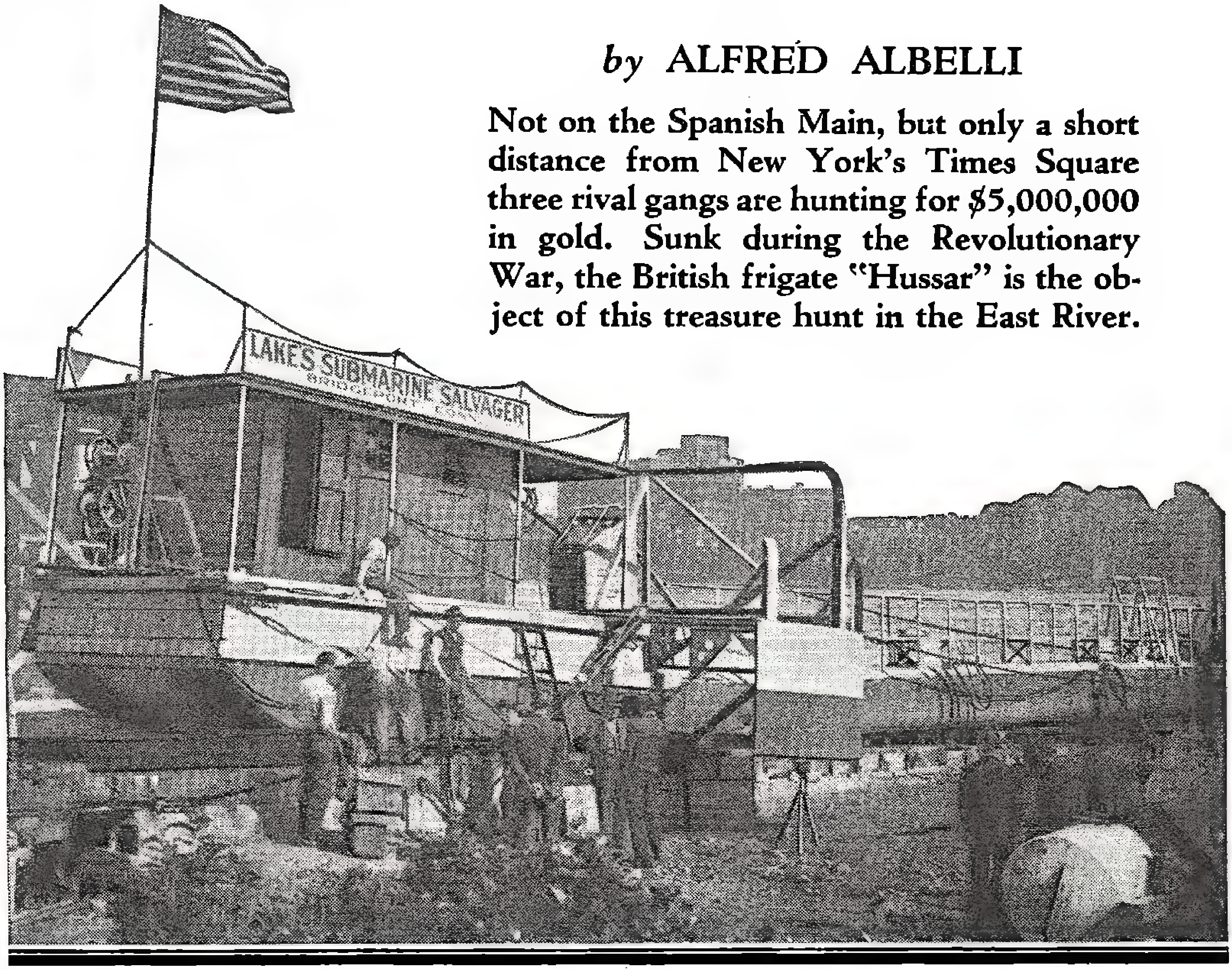
Study Fingerprints With Low-Power Microscope

In examining fingerprints made in this fashion, the lowest power of magnification available on the microscope is used. Prints left on a smooth surface such as a microscope slide by the natural oil of the skin are made visible by dusting with fine powder such as talcum, rouge or lampblack.

Each revolver or rifle barrel signs its own signature on every bullet fired. In a homicide case, if a bullet removed from the body of a victim is found to have a scratch pattern

(Continued on page 124)

Seeking SUNKEN GOLD



by ALFRED ALBELLI

Not on the Spanish Main, but only a short distance from New York's Times Square three rival gangs are hunting for $5,000,000 in gold. Sunk during the Revolutionary War, the British frigate "Hussar" is the object of this treasure hunt in the East River.

Here is the unusual submarine salvage ship "Laksco," invented and designed by Simon Lake primarily for salvaging cargoes from sunken vessels. With it he hopes to find the $5,000,000 gold treasure lying on East River's bottom.

THREE rival salvage gangs—modern treasure-hunters—are now engaged in a nip-and-tuck race to locate the sunken hulk of the British frigate *Hussar* which went to the bottom of the East River, Manhattan, with a $5,000,000 gold cargo on Nov. 23, 1780.

This sensational treasure hunt is raging in a section which is only a five-cent subway fare from Broadway—and not on the Spanish Main where quests for sunken gold have held the glamor in past exploits.

The *Hussar* reposes beneath the turbulent waters of Hell Gate in the East River. Hell Gate is the nickname given for this section of the water-way because of its perilous currents and treacherous whirlpools. Each year it claims a toll of at least 15 vessels. Some of the worst catastrophes in Manhattan's maritime history have occurred in Hell Gate.

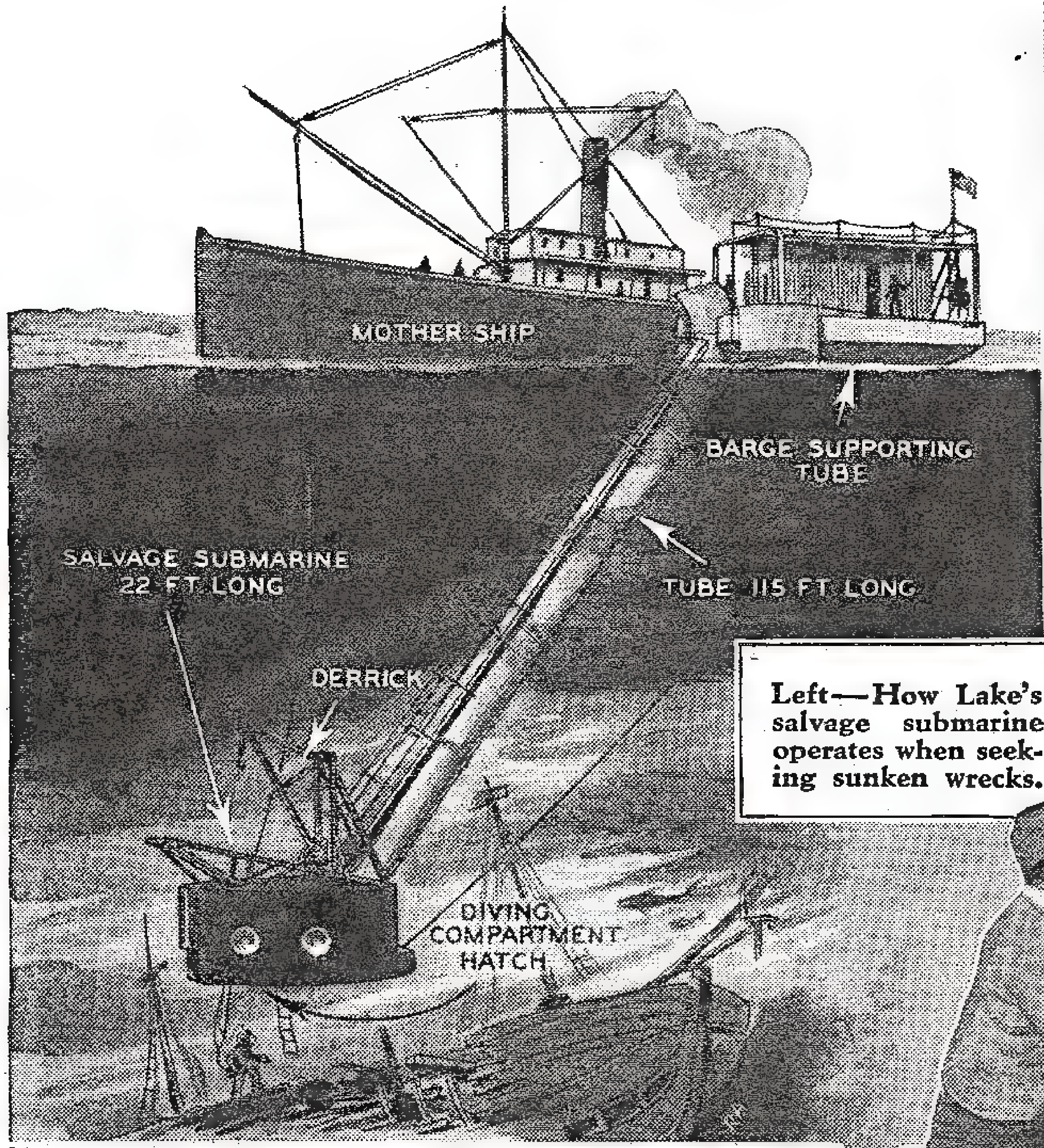
The *Hussar* went down with 107 men on board. There were no survivors. The vast amount of gold coin was intended for the British army forces quartered near New York during the American Revolution.

In September, 1780, according to records in musty archives, the *Hussar* anchored alongside the H.M.S. *Mercury* off the Bronx shore. The *Mercury* had also been sent to pay off the British soldiers. As the *Hussar* was considered a more rugged craft, better qualified to weather the terrors of Hell Gate, as well as any traps set by the Colonial rebels, the *Mercury* transferred her treasure chests to the *Hussar*.

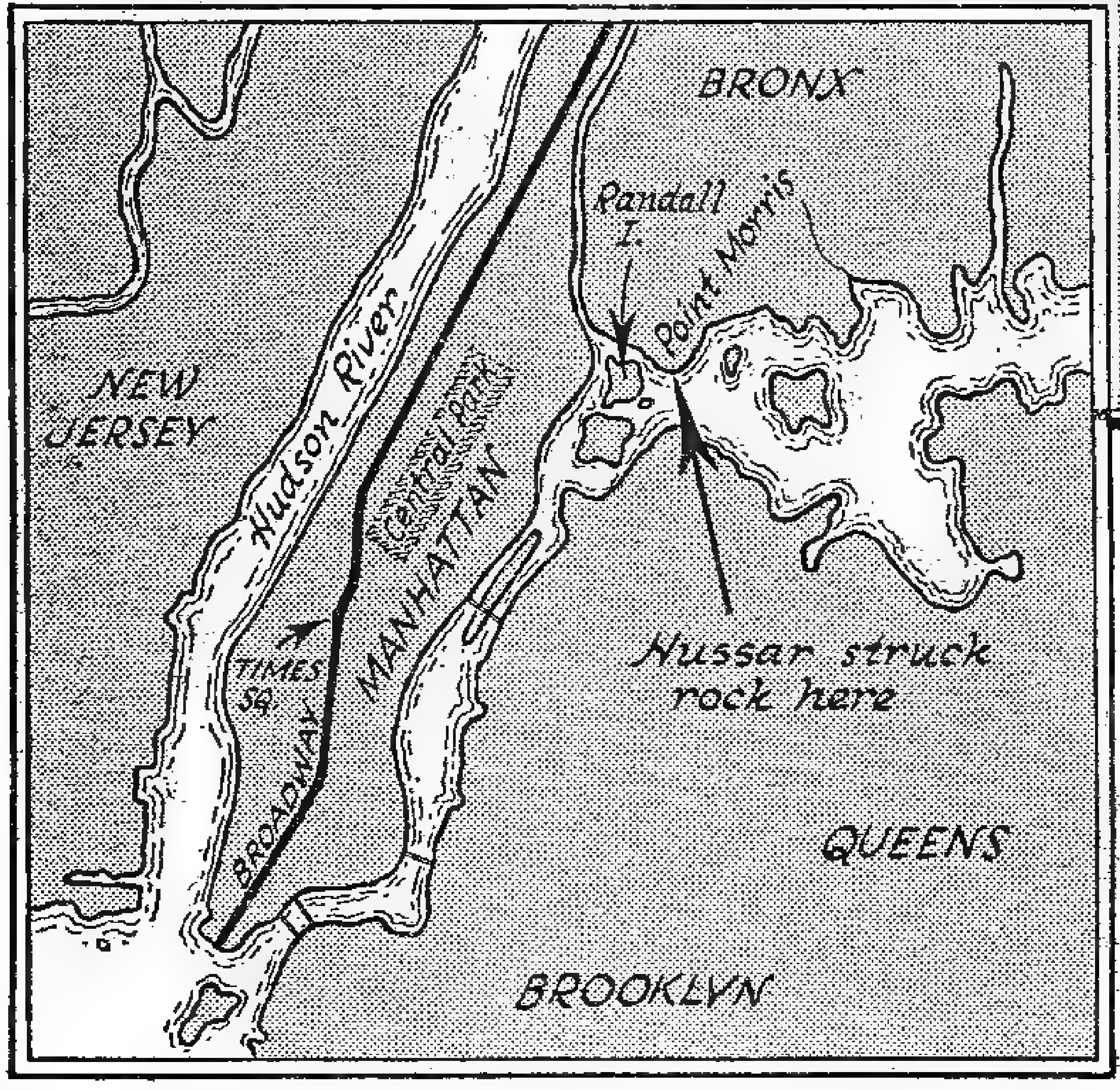
In passing Point Morris, the *Hussar* struck the protruding Pot Rock, tore a huge hole in her bottom and started to fill rapidly. Instantly, the captain steered for shore. In the absence of beaching places, the skipper sent a line ashore by small boat. The line was firmly fastened to a tree at one end and to the sinking *Hussar* at the other.

It was the captain's plan to keep the *Hussar* floating in comparatively shallow water until the money could be taken ashore. But the rope snapped and the ship went down. It so happens that on this side of the river there is a shelf which runs along under the water, hewn out of the

15 Minutes from Broadway


MOTHER SHIP
BARGE SUPPORTING TUBE
SALVAGE SUBMARINE 22 FT LONG
TUBE 115 FT LONG
DERRICK
DIVING COMPARTMENT HATCH

Left—How Lake's salvage submarine operates when seeking sunken wrecks.


BRONX
Randall I.
Point Morris
NEW JERSEY
Hudson River
Central Park
MANHATTAN
TIMES SQ.
BROADWAY
Hussar struck rock here
QUEENS
BROOKLYN

Roy Hansen, noted diver, is shown being lowered into East River to continue search for the "Hussar". His diving suit was designed for the treasure hunt. Map at left shows where the "Hussar" was wrecked. The hulk of the gold laden ship is believed to be off Randall Island.

island by nature. This bar drops suddenly from 17 to 80 feet.

Some of the navigators who have been trying to locate the *Hussar* believe that she went over this ledge and was dragged downstream by the heavy tide currents, and then slid over another cliff and went down to the bottom.

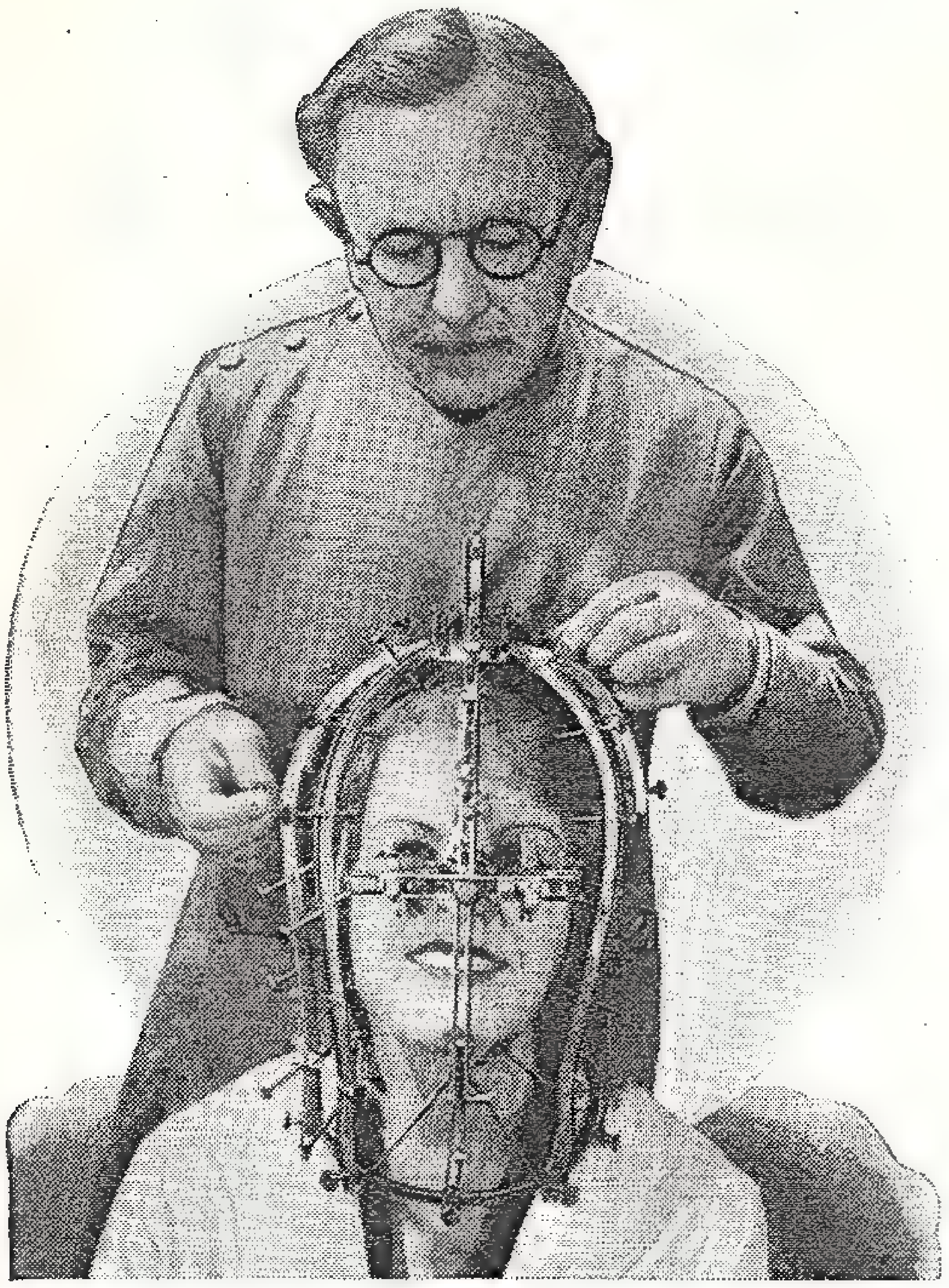
Although the records have placed the *Hussar's* hulk near Randall's Island, between 130th and 131st Streets, divers have not been able to find her. They have come upon several other wrecks, however, but these derelicts carried trade cargoes of coal and minerals—not gold.

The *Hussar* has been worked for treasure ever since 1818. The crude and primitive diving equipment of those days prevented effective work in the surging tides of the roaring East River in the Hell Gate section. In 1819, the records of the present treasure-hunters further disclose, some of her guns and upper sheathing were brought up. These were retrieved, the records state, in a nest 30 feet below the bed of the river.

There have been many attempts to salvage the *Hussar* in the past twenty years. This past summer, however, three expeditions got going with a do-or-die determination, and before the passage of another sum-

(Continued on page 144)

"Beauty Micrometer" Analyzes Facial Flaws for Makeup



Max Factor, Hollywood makeup expert, demonstrates the "beauty micrometer" which analyzes actors' facial flaws.

RECENTLY perfected by Max Factor, one of Hollywood's most famous beauty experts, a new instrument, designed to aid makeup men, accurately registers actors' facial measurements and discloses which features should be reduced or enhanced in the makeup process.

Flaws almost invisible to the ordinary eye become glaring distortions when thrown upon the screen in highly magnified images; but Factor's "beauty micrometer" reveals the defects.

The device, remotely resembling a baseball mask, fits over the head and face with flexible metal strips which conform closely to the various features. The strips are held in place by set screws, allowing for 325 possible adjustments. If, for instance, the subject's nose is slightly crooked—so slightly, in fact, that it escapes ordinary observation—the flaw is promptly detected by the instrument and corrective makeup is applied by an experienced operator.

Windmill Propels Pontoon Boat

THE problem of cheap transportation has been solved by an Oregon man who recently staged a successful demonstration of a home-made "windmill" boat. Twin wind-driven blades supply the power which is transmitted, via a small belt, to the propeller. Two pontoons keep the craft on an even keel.

Although somewhat crude in appearance, the windmill boat has proven to be unusually sturdy and seaworthy.

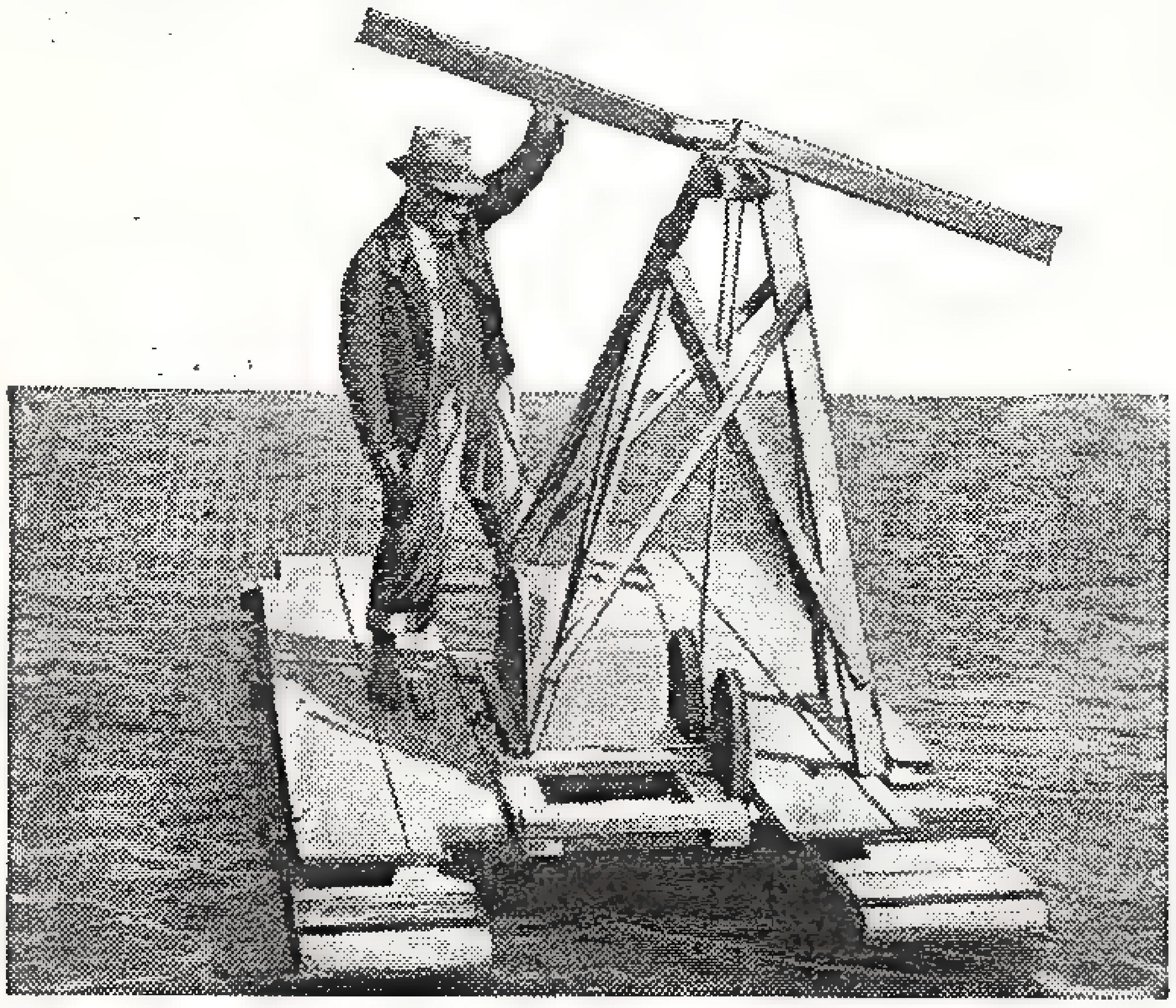
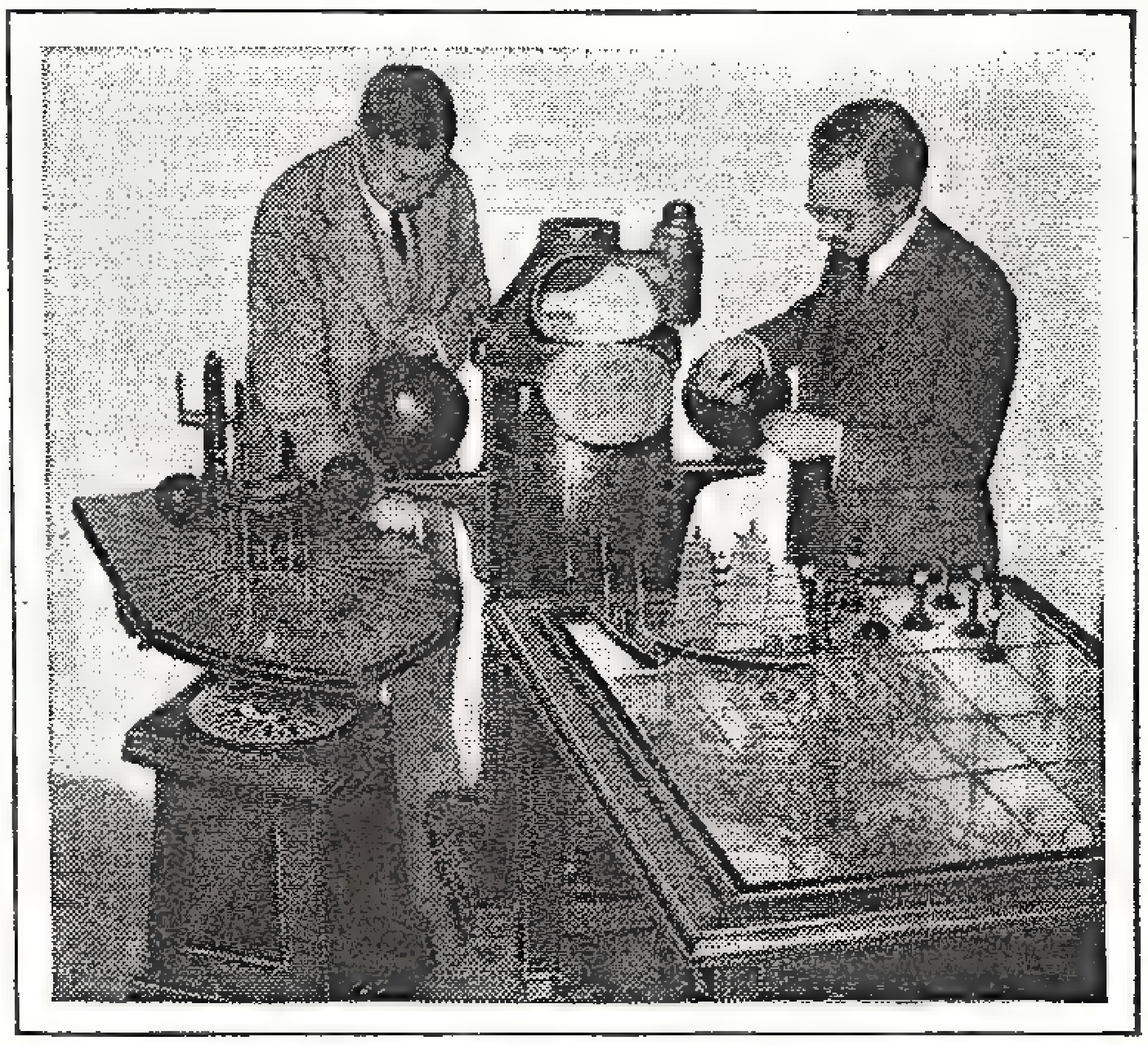


Photo shows wind-powered boat built by Oregon man. A pulley transmits power from the vane shaft to the propeller.

School Trains Future Explorers



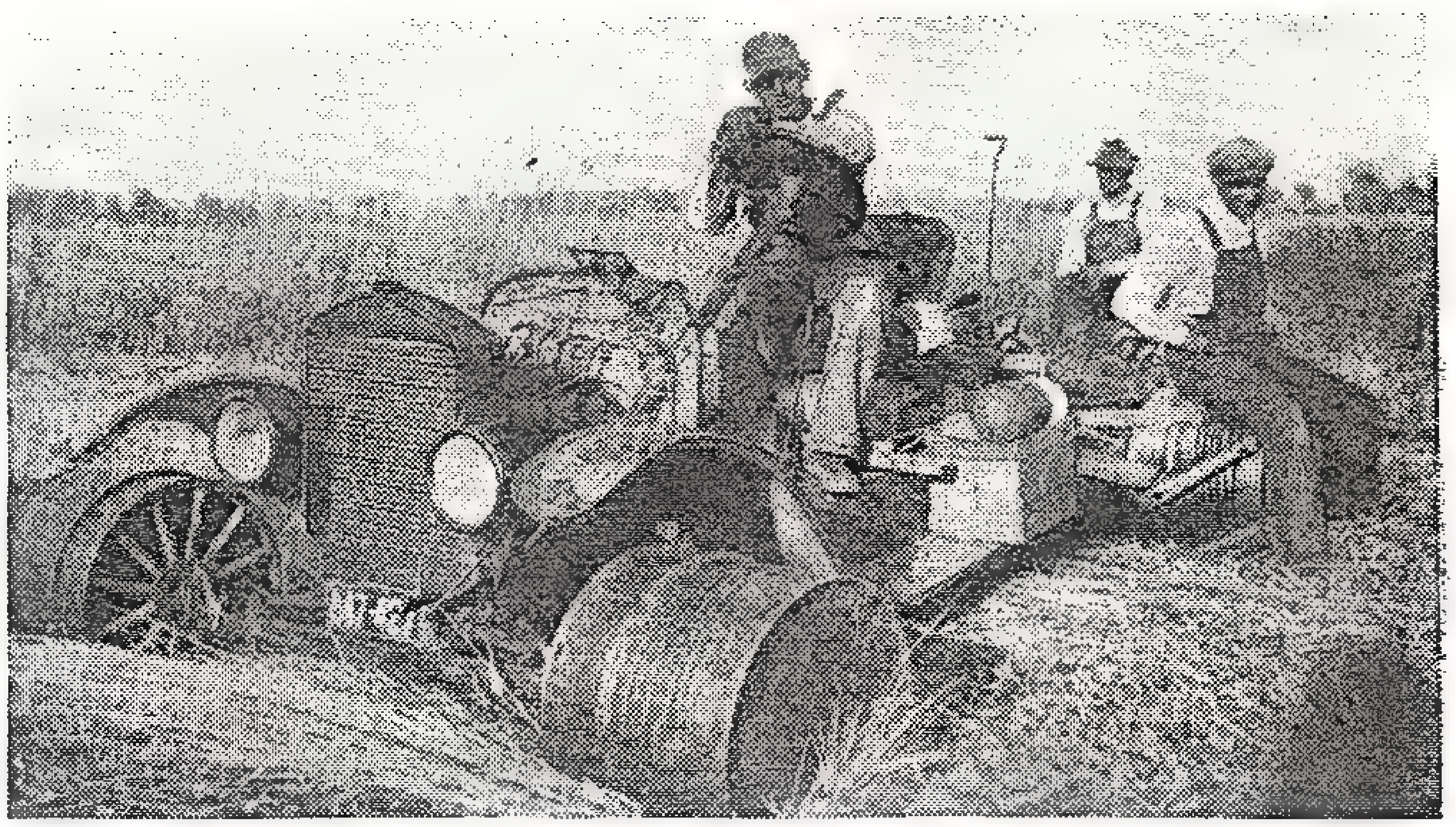
Instructors check navigation apparatus at explorers' school. Note compass board and ship models used for sea problems.

ONE of the strangest schools in America is that of the Institute of Geographical Exploration at Harvard University.

The Institute is the only school of its type in the country, devoted to the training of young men for the field of exploration. Here the lad with the urge to push back the frontiers of civilization learns the technical requirements of the explorer's trade.

The students work both with practical instruments and with scale models. Instruction is given in the art of checking the accuracy of a compass and similar navigation problems. Model ships are similarly used, together with other marine equipment.

Novel "Bog Hopper" Harvests Hay on Soggy Ground



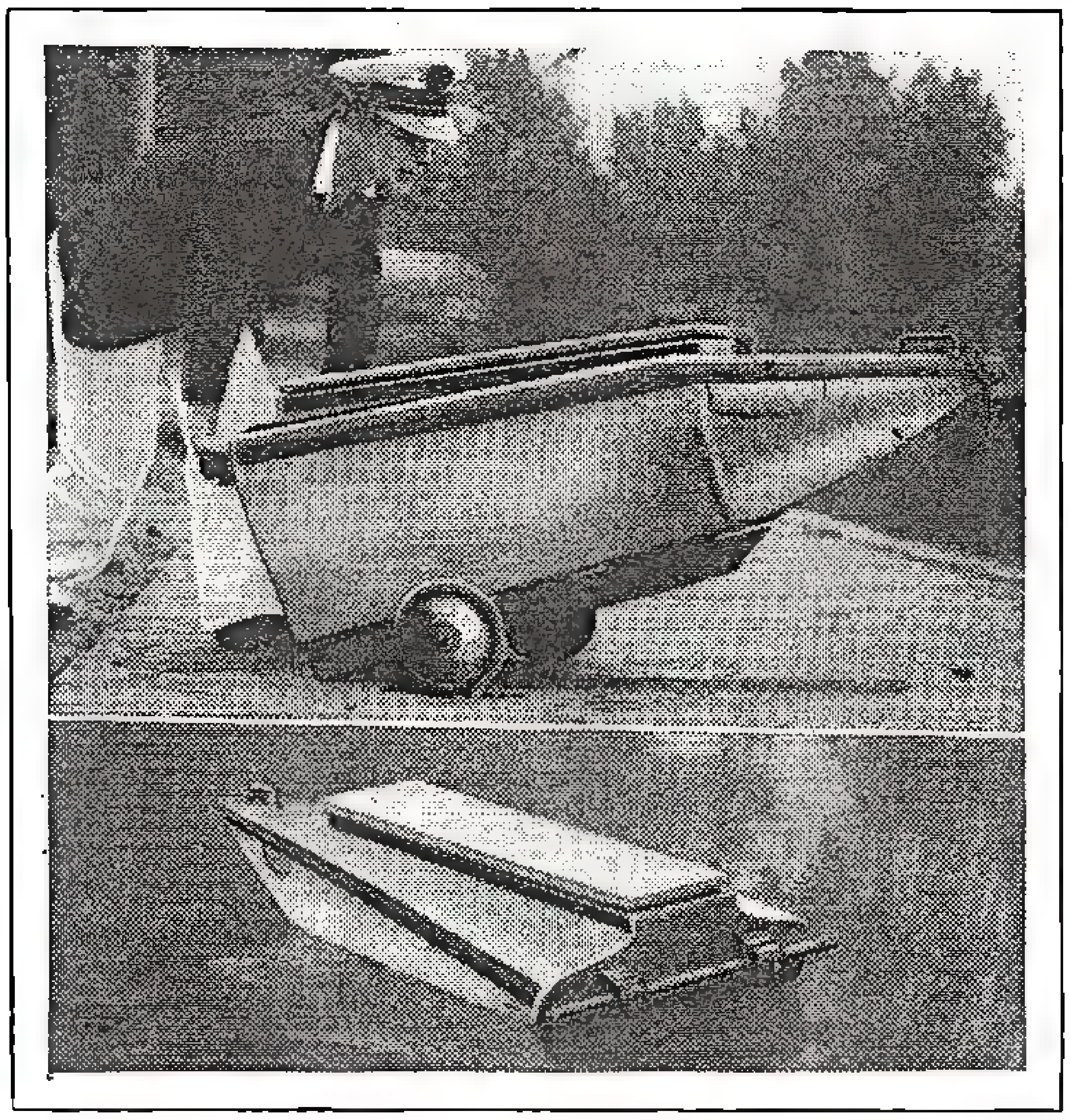
Horses and ordinary farm equipment would be hopelessly mired in this soggy ground, but not the home-made "bog hopper" shown in the photo above. Steel drums bolted to the wheel rims keep machine from sinking.

FARMERS in Ottertail county, Minnesota, have solved the problem of harvesting hay in marshy ground with a Ford-powered "bog hopper" which not only wades right in where horses fear to tread but, better yet, comes out again under its own power.

Attached to each wheel of the ingenious machine is a half section of a 55-gallon steel drum strongly bolted in place. The back barrels are equipped with wooden lugs to provide traction. A Chevrolet shift affords a lower gear ratio and greater speed flexibility.

Three extra bull wheels are attached to the mower to keep it from bogging down. An outlay of less than $5 was required for parts for the machine, which was built in two days. With the use of the unique device between 7 and 8 acres of hay were harvested in one day with a five-foot mower. Water standing above ground failed to halt the machine.

Battery Drives Odd Rescue Craft



Top photo shows carriage for launching the rescue craft. Below—Device in the water. Note the towing handles.

POWERED by an electric motor run by a 12-volt storage battery, a novel rescue craft enables life guards quickly to reach a drowning person.

Resembling a small boat cut through the the middle, the craft is equipped with handles to which the guard clings as he is towed through the water. The battery operates a small propeller beneath the boat.

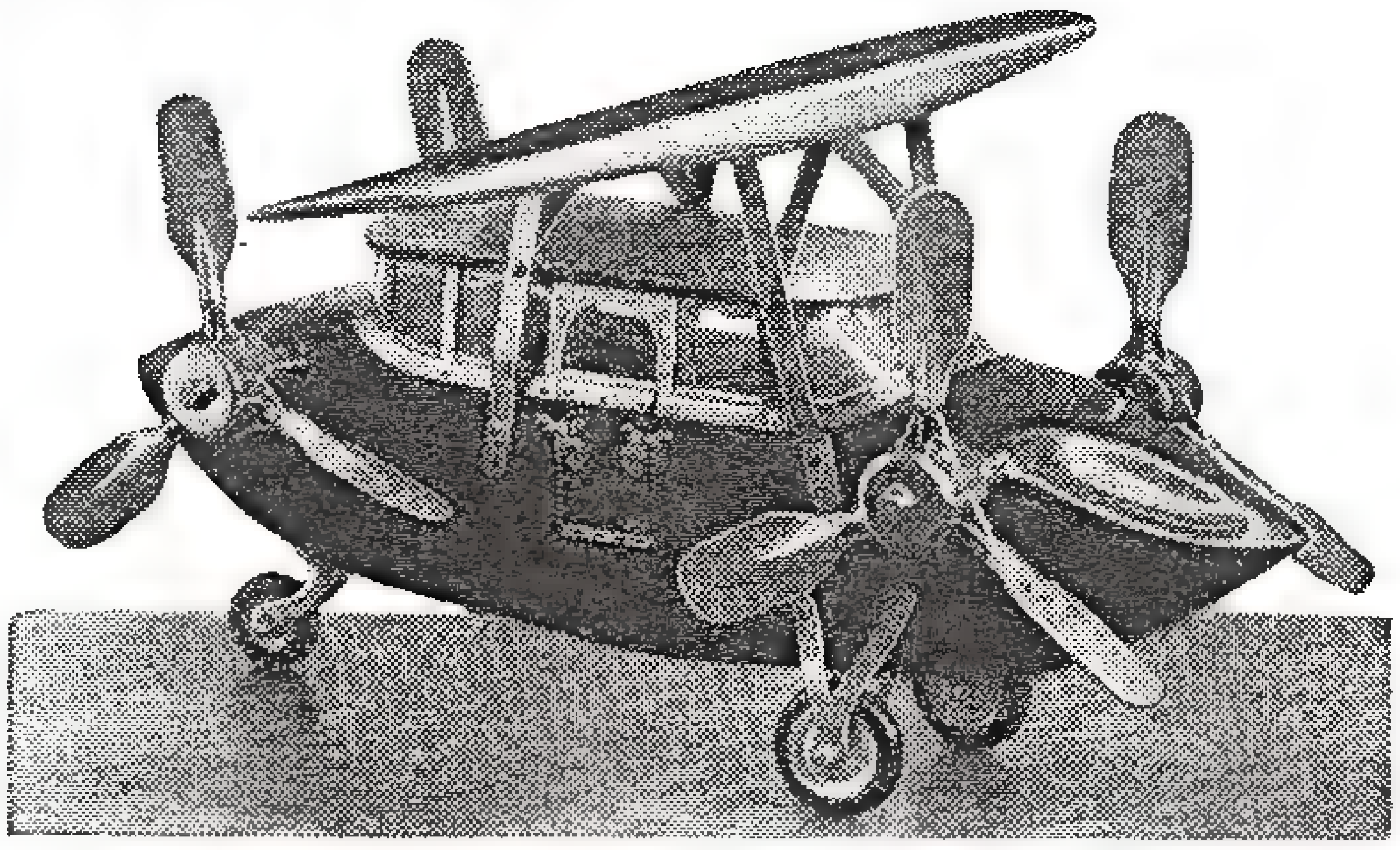
"Paddle" Plane Needs No Rudder

AN AIRPLANE that "paddles" its way through the air as a duck paddles through the water yet requires no rudder control is the latest aviation idea designed to eliminate large fields for landing and taking off.

The new ship, still in the experimental stage, resembles a motorbus body with an overhead wing and two sets of triple-bladed propellers at front and rear. In each of the propeller hubs is a cam-and-shaft device which twists the blades as the hub revolves. With this arrangement the blades are turned to strike the air with their flat sides on the forward and downward stroke. On the upward stroke the blades are turned so that they cleave the air with their thin edges, thus reducing the air resistance to a minimum.

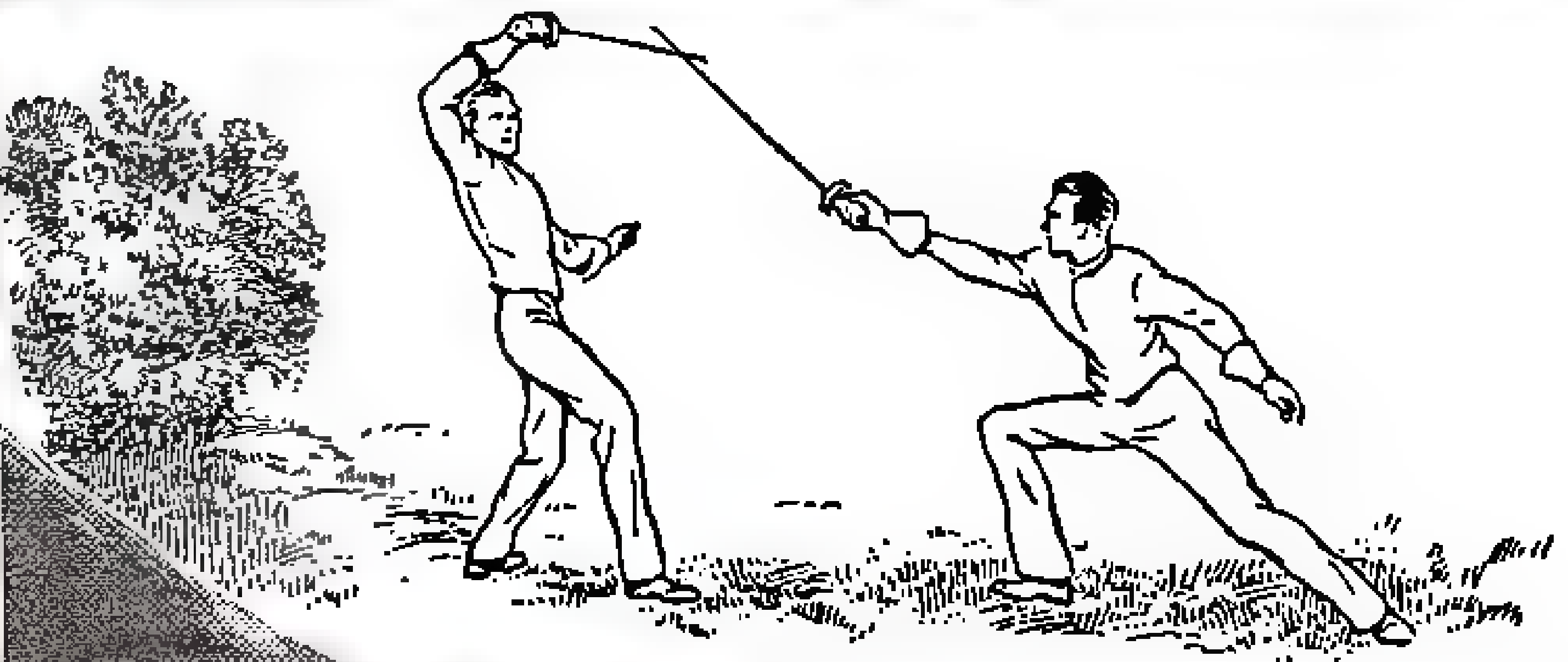
With the blades set in the "paddle" position, the inventors hope to achieve a vertical climb and descent eliminating the necessity of large takeoff or landing fields.

The ship has no rudder. Steering control is effected by varying the speed of the twin sets of propellers.



A cam-and-shaft arrangement in propeller hubs enables blades to be tilted at will of pilot. When striking air flat, blades are said to effect vertical climb or descent.

THE SECRETS SOUND



Modern Mechanix and Inventions Exclusive Photo

The thrilling sound of sword or saber duels is simply the clash of knife and fork. Note idle rapiers of the players while the soundman at rear near the mike holds knife and fork ready.

by W. L. COLLINS

HOW did the broadcasters ever teach a tree toad to emit its mournful cry—on cue—for that outdoor program you tuned in on last night? More than likely the tree toad was Ray Kelly, NBC sound technician, plus an ordinary comb!

Mr. Kelly ran his fingers—with the proper pressure—over the teeth of the comb, and it was the cry of a tree toad to you!

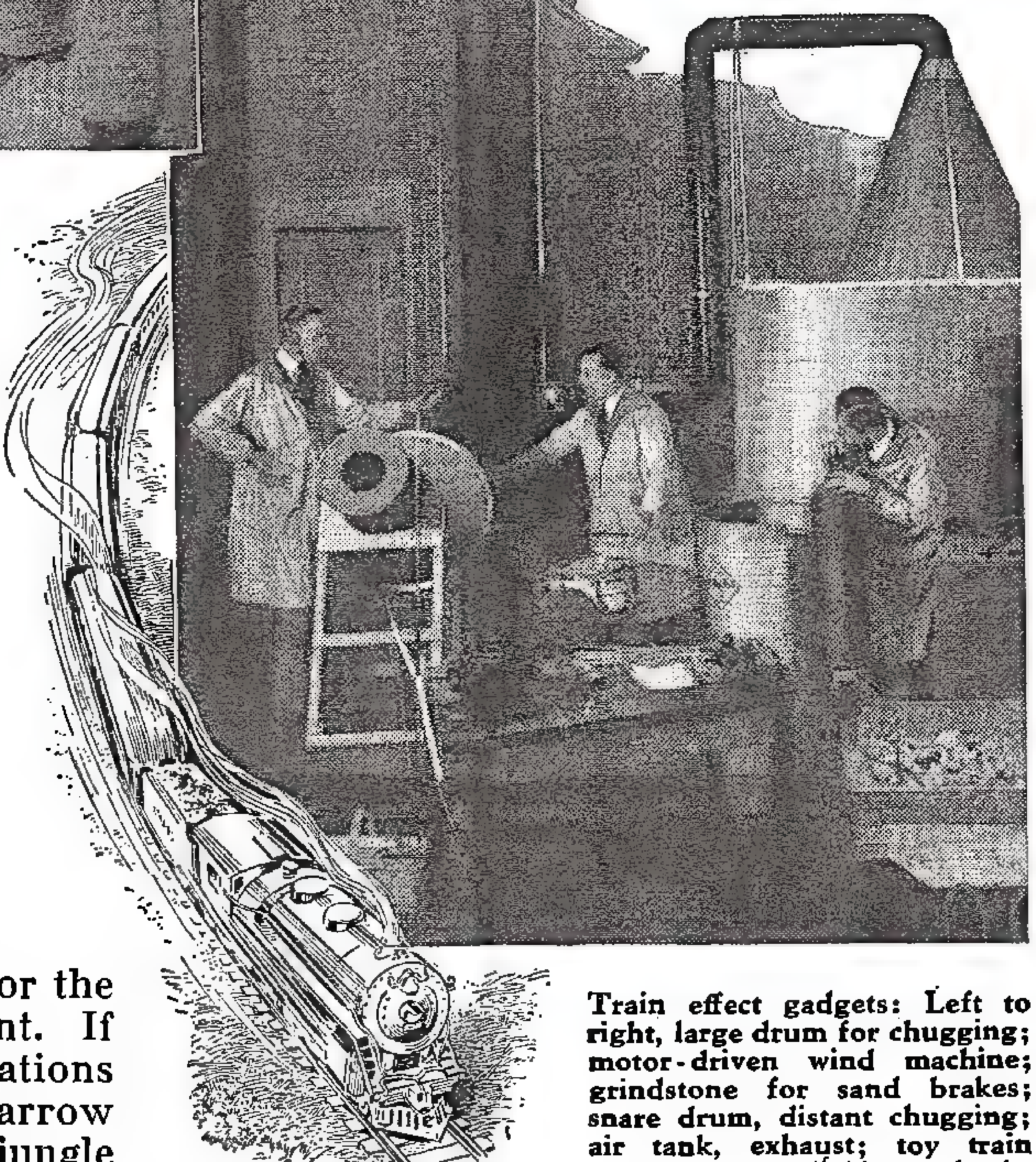
The continuity writers care little for the labors of the production department. If their imagination conjures up situations calling for footsteps in the mud, an arrow imbedding itself in the heart of a jungle savage, coffee boiling, bacon frying, a man's head being split open with an ax, the writers write merrily away and trust to the ingenuity of the technicians to imitate the sounds called for by the script.

Naturally, some of these sounds must be faked; but, you say, why imitate common sounds such as a boiling coffee pot, for example? Why not put a pot of boiling coffee in front of the microphone and let it go at that?

The process, unfortunately, is not quite that simple. Experience has taught sound technicians that the microphone, the ether and your receiving set do queer things to sounds. By the time the bubbling of the coffee pot reaches your ears the sound resembles the roar of the surf.

Hence Mr. Kelly and his assistants are not trying to fool you when they boil oil in the frying pan before the microphone and the actor remarks, "Ummmm, that coffee smells good." They have to fool the "mike."

"Sounds don't sound as they sound," says

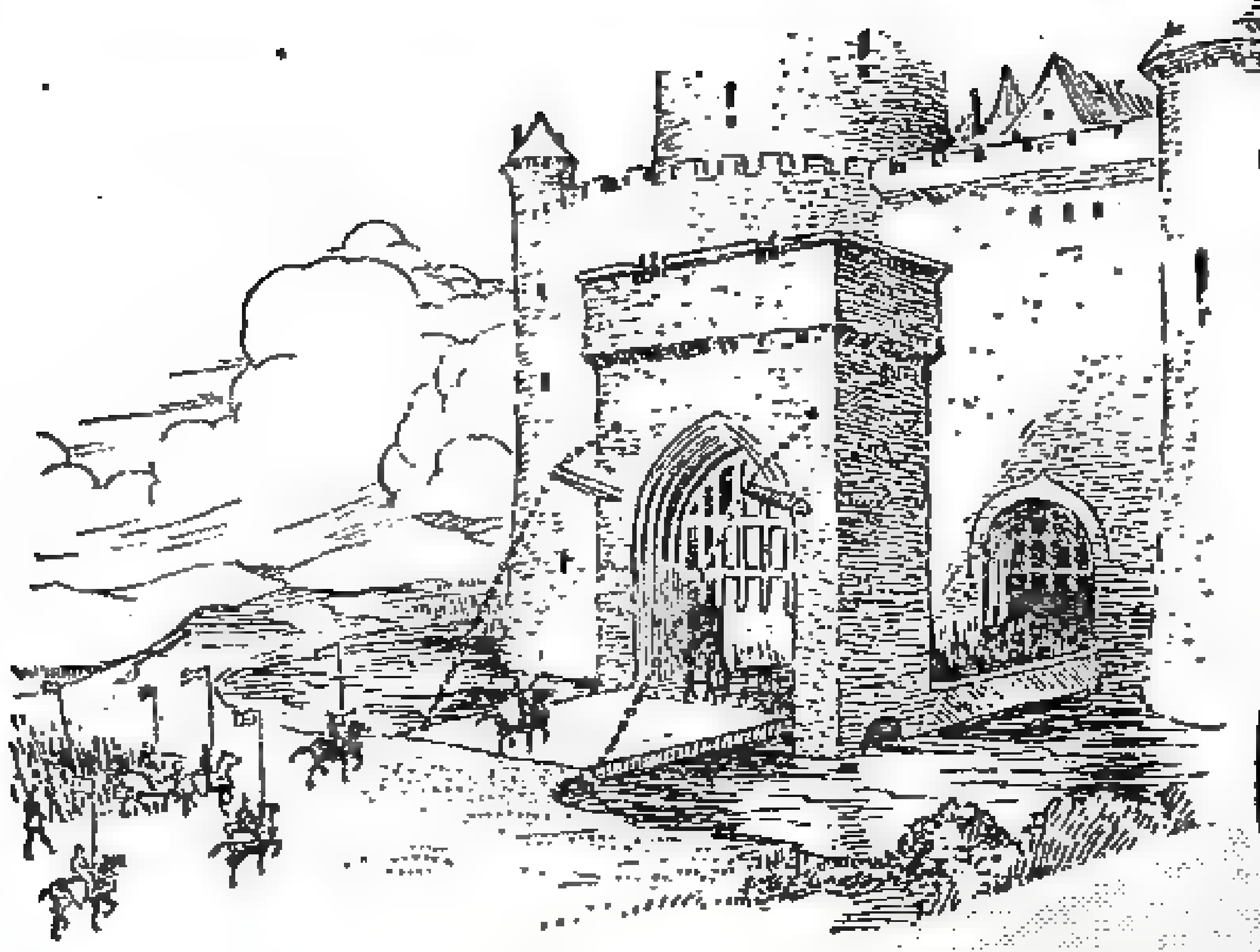


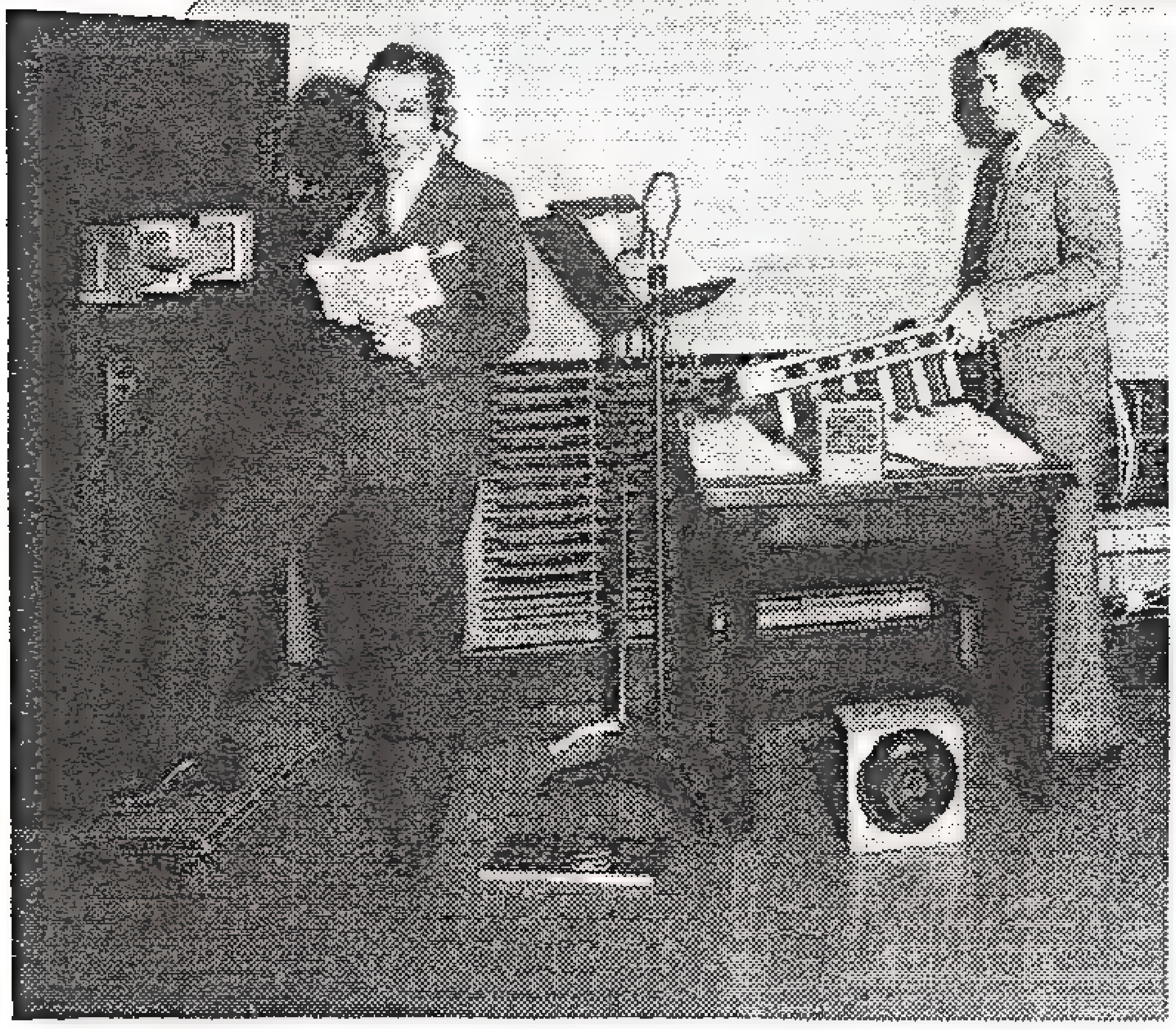
Train effect gadgets: Left to right, large drum for chugging; motor-driven wind machine; grindstone for sand brakes; snare drum, distant chugging; air tank, exhaust; toy train under cone, clicking wheels.

# of RADIO'S EXPERTS

Modern Mechanix and Inventions Exclusive Photo

In the exclusive picture shown above, NBC artists demonstrate a scene from an air thriller—a head-splitting sequence. Note soundman about to bury hatchet in cabbage head. Circle left—Ray Kelly, technician, many of whose sound devices are described in accompanying text.





For programs with a medieval background, equipment above is used. Box-like affair at left imitates sound of heavy door, with latch for drawing of door bolt. On the floor are chains for sound of raising drawbridge. Man at right imitates sound of soldiers marching over wooden drawbridge.

Mr. Kelly. "To simulate a rap on a window, for instance, the obvious thing is to rap on window glass with the knuckles. But over the mike," explains Mr. Kelly, "it sounds too thin. We tried tapping a pencil on glass, but it was too metallic. We tapped slate, books, walls, doors, with knuckles, pencils and xylophone sticks. Finally, by accident, one of the soundmen hit the triple-ply glass that separates the control booth from the studio and the rap went over the mike. Perfect!"

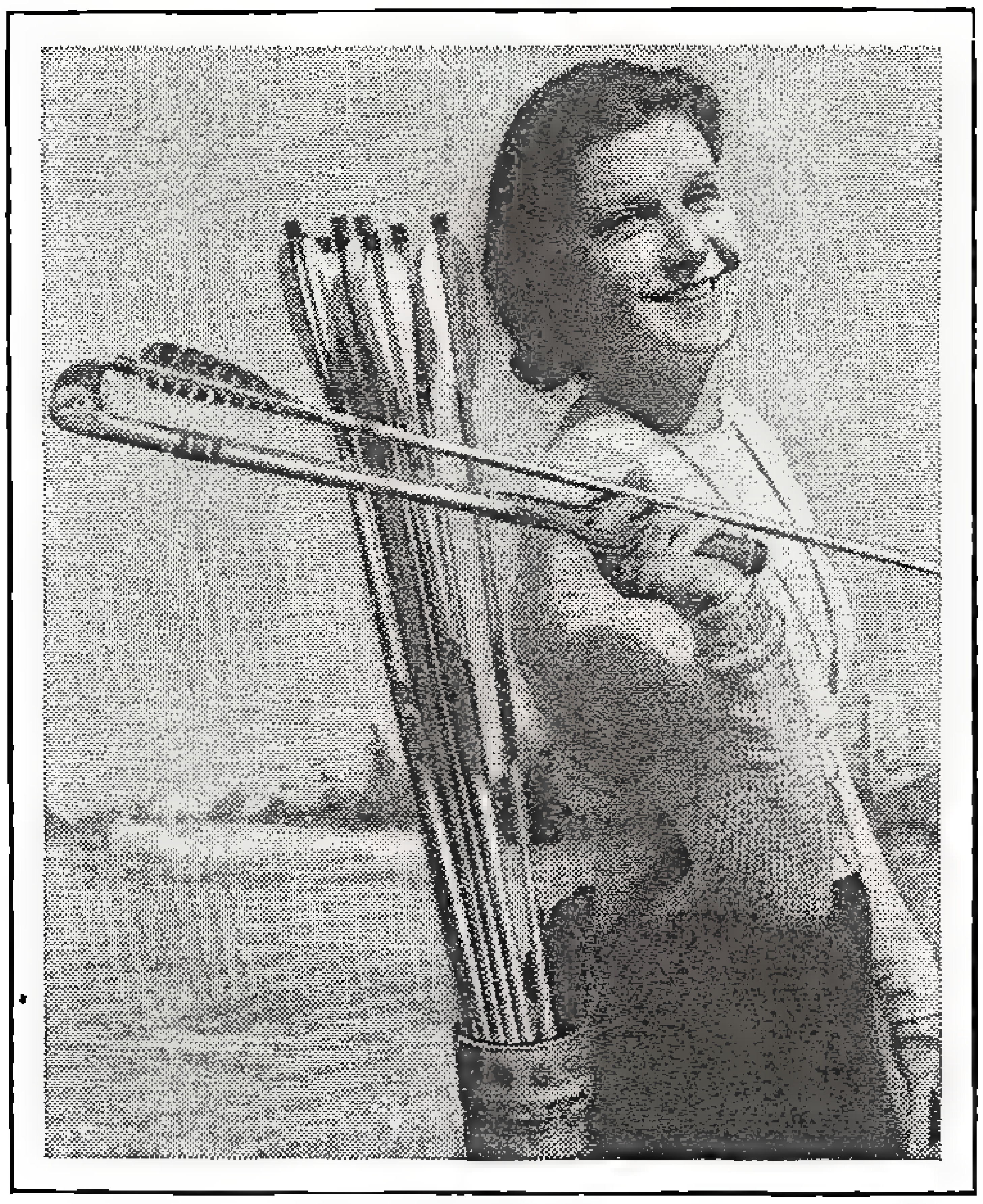
When Amos 'n' Andy first went on the air with their OK Hotel, a real telephone switchboard was constructed for them at great expense. "It sounded like a house falling down when it came over the air in the rehearsal broadcasts," Mr. Kelly reveals. Hence you never heard it. The sound engineers went into a huddle and when they came out of it they brought with them an ordinary cigar box with a buzzer and dry cell battery on the inside. This was the buzz of the switchboard. Atop the cigar box was a closet latch which produced the noise of a cord plug being plugged into the switchboard. The whole contrivance cost less than a dollar.

The vibration sounds of the engines of a steamboat almost drove the engineers from their laboratory to sanitariums. But they finally emerged from what is probably the queerest laboratory in the world with a "dingus" to make a noise like the engine vibrations. It is very simple. A length of iron pipe is suspended from a support by a heavy spring. The pipe is given a tug and the tortional action of the spring comes over the ether as the vibrations of a steamboat engine.

Footsteps in the mud? Well, the "plumber's friend" proves to be the sound engineer's friend also. Working a sink plunger up and down in a box of wet bran

(Continued on page 118)

Ancient Mayan Throwing Stick Modernized by Bowmen



Mrs. Robert Stacy-Judd, wife of the famous archaeologist, demonstrates use of modernized version of the ancient Mayan throwing stick on a Los Angeles archery range.

BORROWING an idea from the Mayan Indians of Yucatan, Los Angeles sports enthusiasts have revived the ancient throwing stick to add new zest to the enjoyment of modern archery.

Used instead of a bow to hurl arrows great distances with deadly accuracy, the throwing stick, or "hul-che," was used for both hunting and combat by the ancient Mayans. Several specimens of the weapon were found by Robert B. Stacy-Judd, famous archaeologist, and were given to Earl B. Powell, nationally known archery expert, who developed them as a modern sports accessory.

France Tests New "Cannon" Plane

DESIGNED to intercept fleets of enemy bombers and destroy them with powerful shells, France's new "cannon" plane, a heavy bomber equipped with a 75 millimeter gun, has successfully passed its first test, according to recent dispatches from the French capital.

Mouth pointed out between the wing braces, the gun was fired from a porthole in the cabin of the plane. The gun was fired five times without causing undue vibration in the plane and its aim was said to be accurate. Tests of the new plane were held above the Cazaux airport.

Stand Holds Breakfast Newspaper

This ornamental stand of brass wire holds the morning newspaper firmly in place at table.

MADE of heavy brass wire and ornamented with a copper rooster, a handy stand eliminates the difficulties of reading a paper at the breakfast table. The stand holds a folded newspaper firmly in place or may be used equally well as a rack for either books or magazines.

Lamp in Knocker Lights Keyhole

THE annoyance of fumbling in the dark for a keyhole late at night has been overcome with a new door fitting. Hidden in the hammer of a brass door knocker is a tiny bulb which throws light downward when knocker is raised. Two small batteries furnish current.

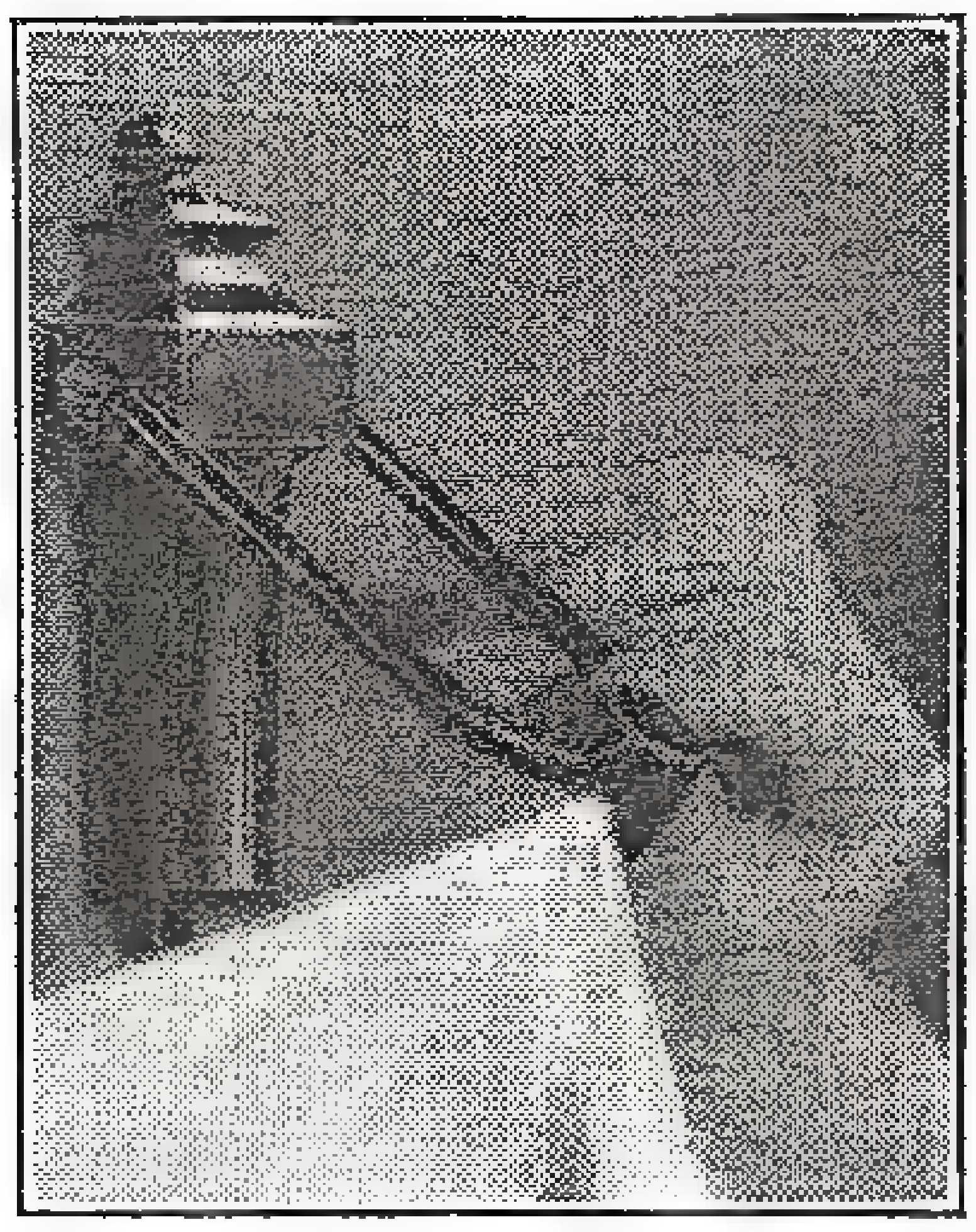


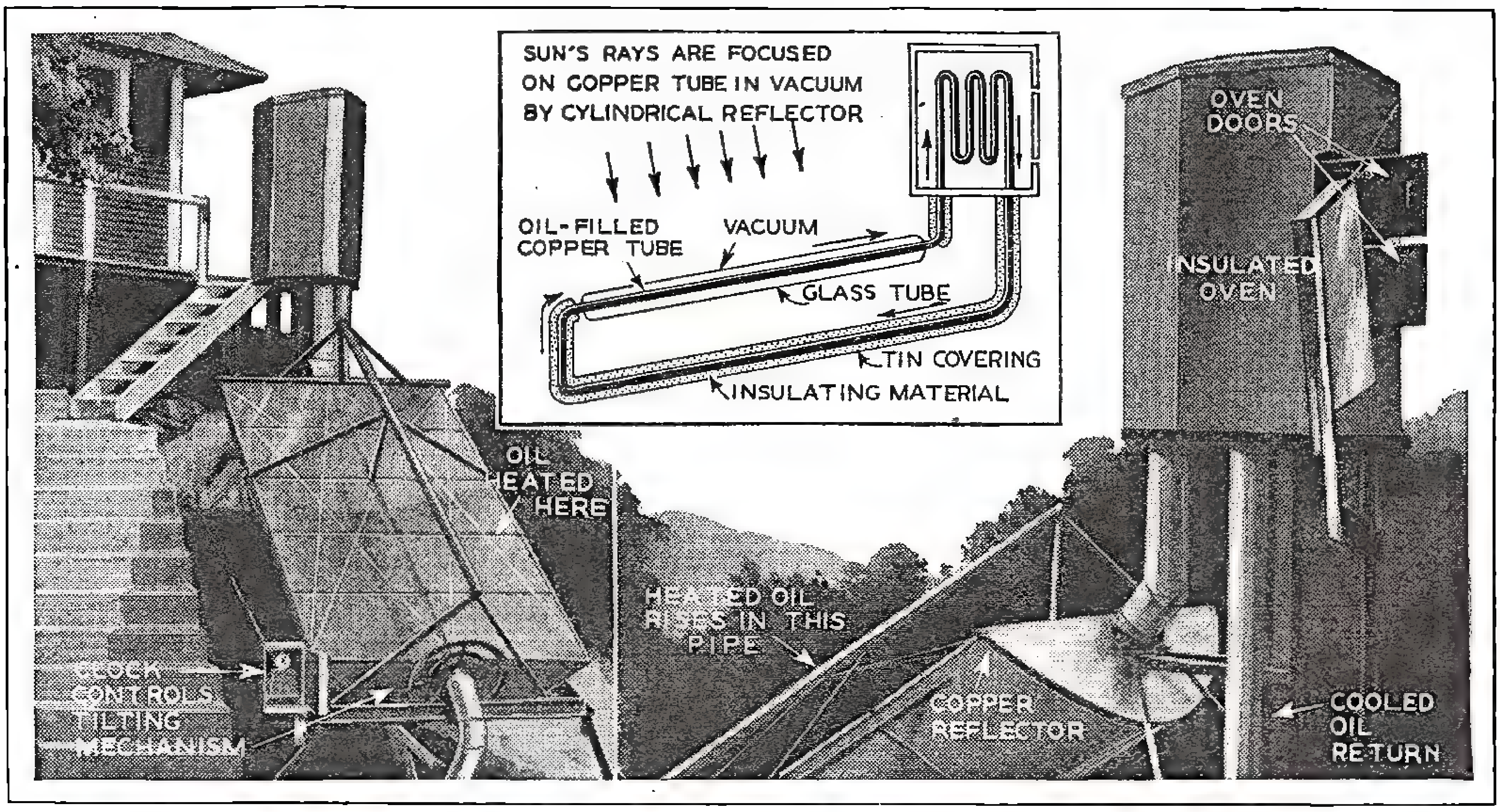
Photo shows how the knocker light illuminates the keyhole.

Women Stars Wrestle Under Water

ONE of the world's strangest athletic events was held recently when Dolly Dalton, Canadian champion, engaged Dixie Taylor, southern women's champion, in an underwater wrestling match at Silver Springs, Florida. The remarkable clearness of the water enabled spectators to follow every move of the contestants. Good wind is essential for this strenuous sport.

An action photo of the under-water wrestling match at Silver Springs, Florida. Note the fish in the foreground.

Solar "OIL STOVE" Heats Baking Oven

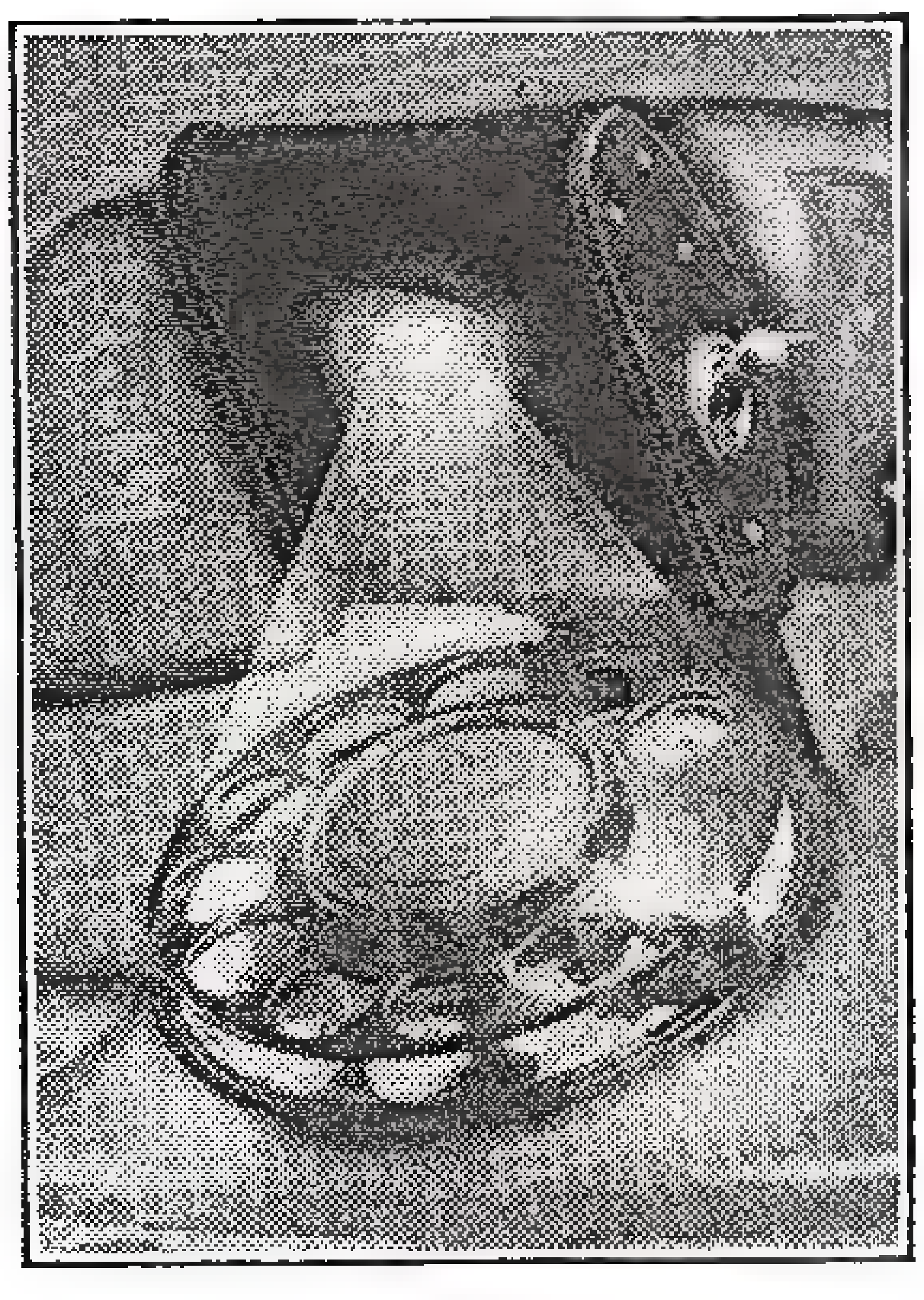

SUN'S RAYS ARE FOCUSED ON COPPER TUBE IN VACUUM BY CYLINDRICAL REFLECTOR
OIL-FILLED COPPER TUBE
VACUUM
GLASS TUBE
TIN COVERING
INSULATING MATERIAL
OVEN DOORS
INSULATED OVEN
OIL HEATED HERE
HEATED OIL RISES IN THIS PIPE
CLOCK CONTROLS TILTING MECHANISM
COPPER REFLECTOR
COOLED OIL RETURN

Photos and diagram above show how sun's rays, focused upon oil-filled tube at point of vacuum enclosure, cause oil to rise, throwing off 300 to 400 degrees of radiated heat in the oven, permitting baking of bread or broiling of bacon.

BY FOCUSING the sun's rays upon an ingenious mechanical contrivance a California scientist has trapped sufficient solar heat for ordinary broiling and baking.

Falling upon a glass-covered trough whose face is kept toward the sun by a clock mechanism, the sun's rays are focused by curvature of the trough upon an oil-filled copper tube. This tube is filled with heavy machine oil and is enclosed in a special glass tube, creating a vacuum. Heated by the focused solar rays, the oil rises and circulates around the sides of an oven, leaving from 300 to 400 degrees of heat. The cool oil then gravitates back into the trough again, automatically maintaining circulation.

Lamp Illuminates Phone Dial



Small bulb and flashlight batteries furnish light for dial.

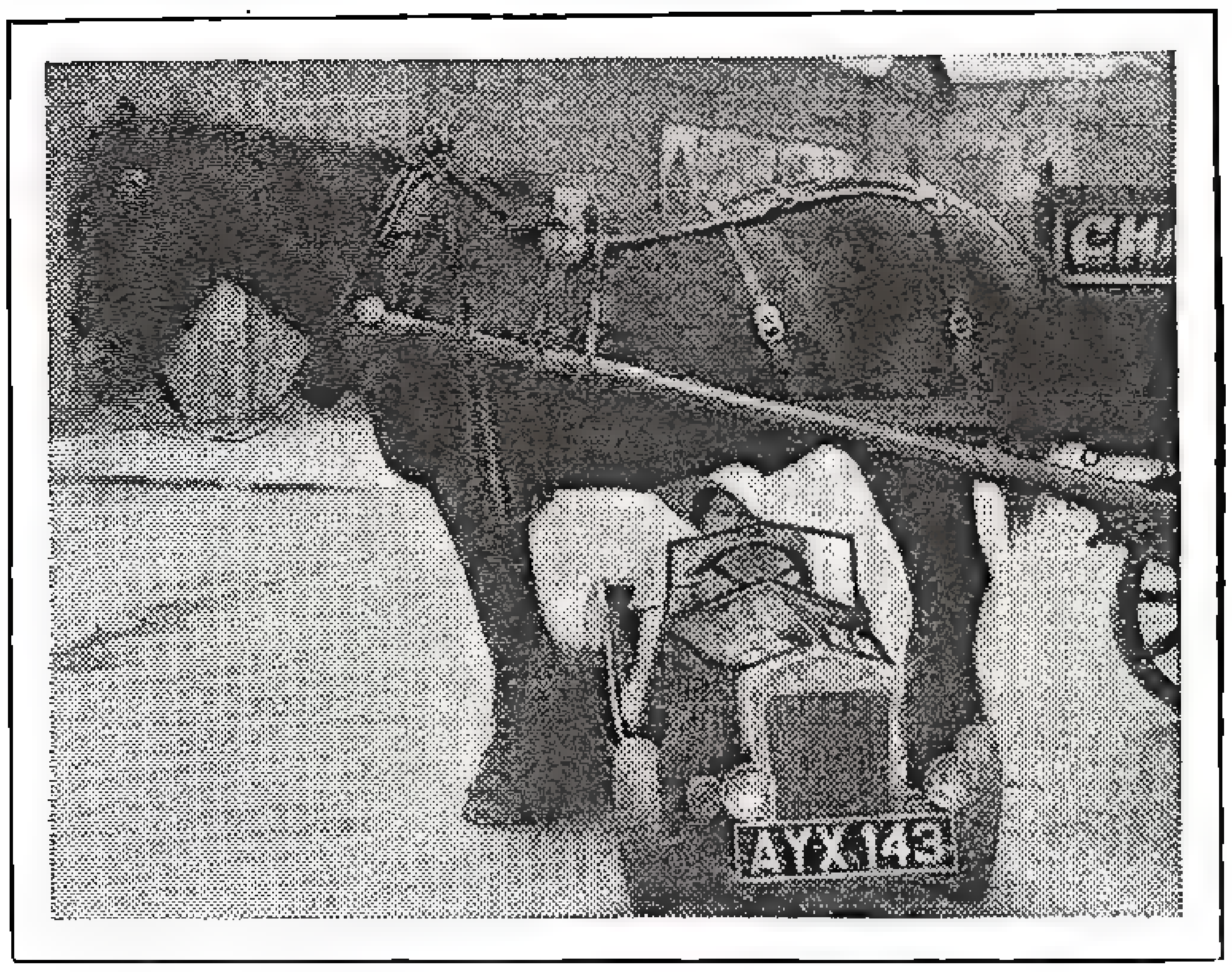
NEWEST of the telephone conveniences is a lighting device which illuminates the dial. Two flashlight batteries and the small bulb are contained in the compact case which fits either cradle or upright type phones. Ample light is furnished either for dialing or making memorandums beside the telephone.

Single Pedal Controls Tiny Car

COMPLETE in all practical details, yet so small that it scoots easily beneath a horse, an English midget auto has made driving possible for anyone by eliminating clutch, brake pedals and gear shift lever.

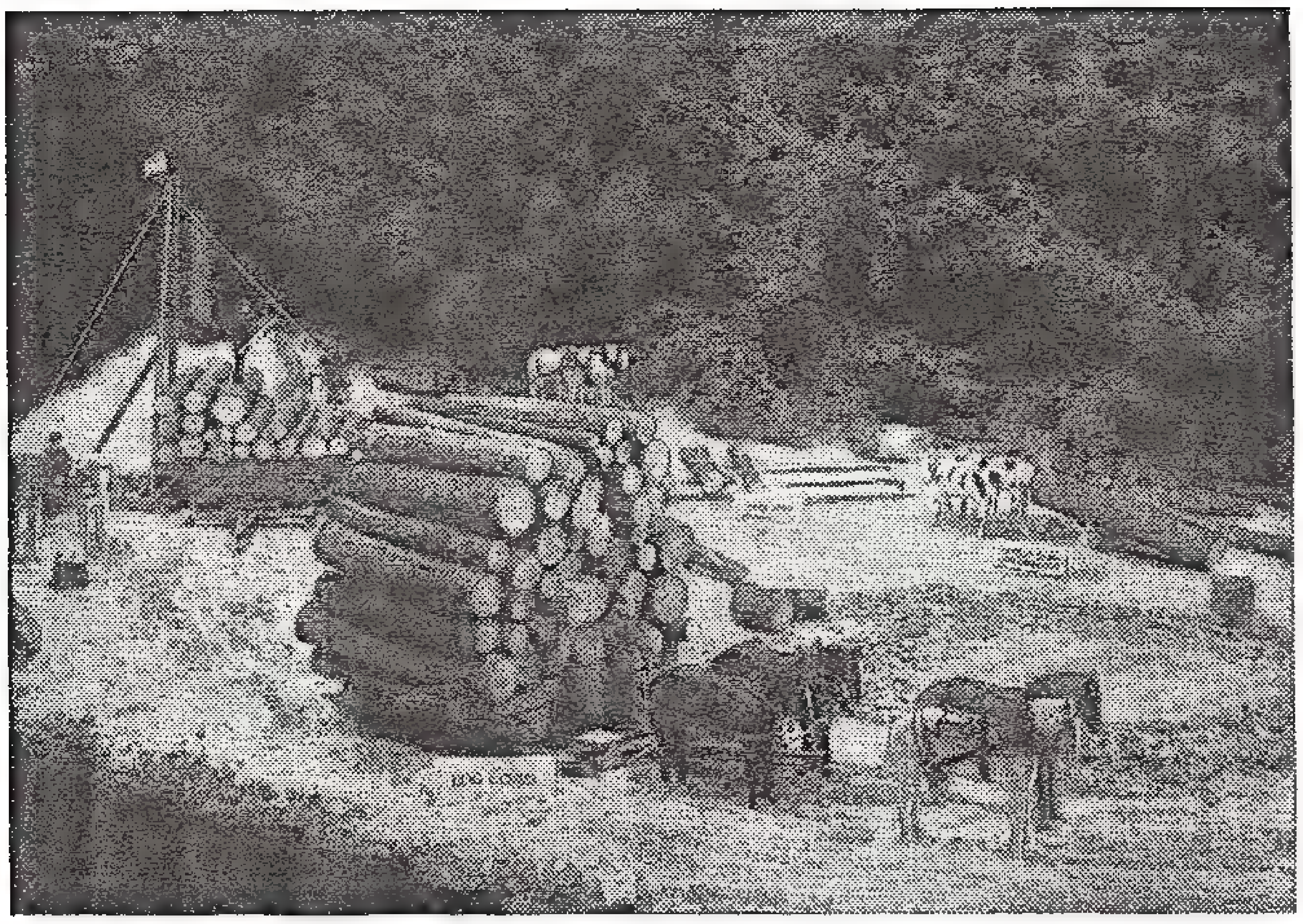
All motor control functions are centered in a single pedal. When this pedal is at full height, the brakes are automatically set hard. Brakes are released and engine accelerated as this pedal is depressed.

The tiny cars weigh about 200 pounds, average about 15 m.p.h. and travel about 70 miles to a gallon of gas. The 1 h.p. motor is rear mounted; and the entire rear assembly, including wheels and motor, may be removed in minute by unscrewing four nuts.



Now in quantity production in England, this midget car averages about 15 m.p.h. and travels 70 miles to the gallon.

Hand-Carved Model Reproduces Minn. Logging Scene



Above is shown a faithful reproduction of a northern Minnesota logging camp in action, hand-carved by Oscar Stenberg, Minneapolis craftsman.

THE logging days which once made Minnesota famous live again in a remarkable model of a north woods logging scene recently completed by Oscar Stenberg, Minneapolis wood carver.

Occupying an area of about 8 square feet, the model is hand-carved and required 3 years to build.

Against a background of spruce and Norway pine, typical of northern Minnesota, Stenberg has constructed a model showing the major woods operations. Teams are shown hauling the rough logs to a skidway where men armed with peaveys and pike poles load the logs onto the waiting sleds. Another interesting feature of the model is a replica of the old water carts. This equipment was used to ice the runways over which the sleds traveled with their heavy loads. A combination of cotton and mica covers the ground like snow, adding the final realistic touch.

Device Projects "Micro Movies"

LIVING specimens, as seen through a microscope, may now be thrown upon a screen with a new micro projector especially designed for the student of amateur microscopy.

With the new instrument the microscope fan may satisfy a natural desire to show his friends what he sees in the microscope by projecting the object on a translucent screen through the aid of a powerful light and condenser. The projector operates on 110 volt, A. C. current only but may be used with any of the common types of microscope now on the market.

Another feature of the new machine makes it valuable to the amateur student of microscopy. By clipping a mounted mirror to the eyepiece tube of the microscope, the image is thrown down on paper or notebook where it may be rapidly and accurately traced.

Mirror clipped to eyepiece tube throws image of specimen onto paper where it may be easily and accurately traced.

Safety Bumper to Cut Accidents

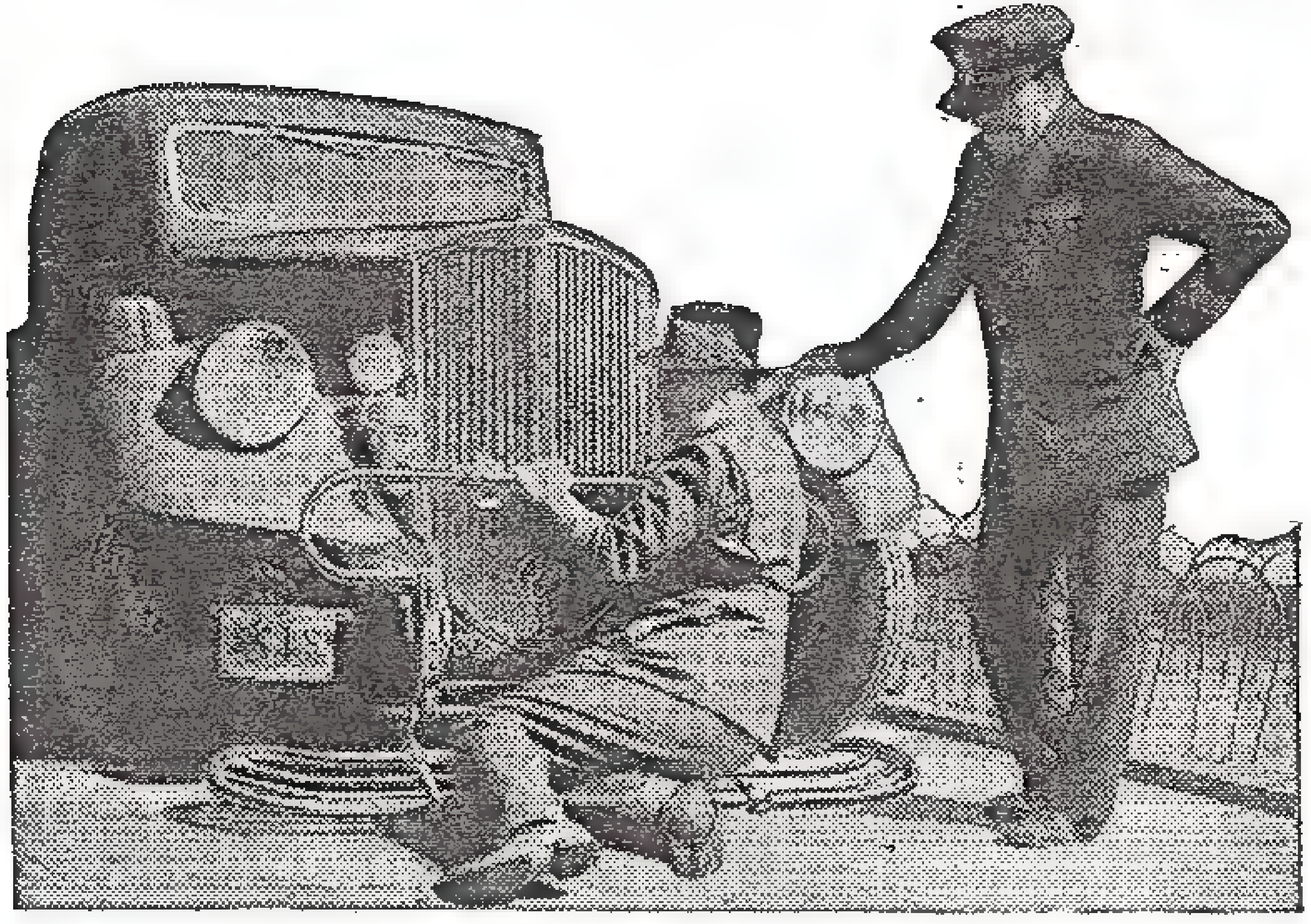
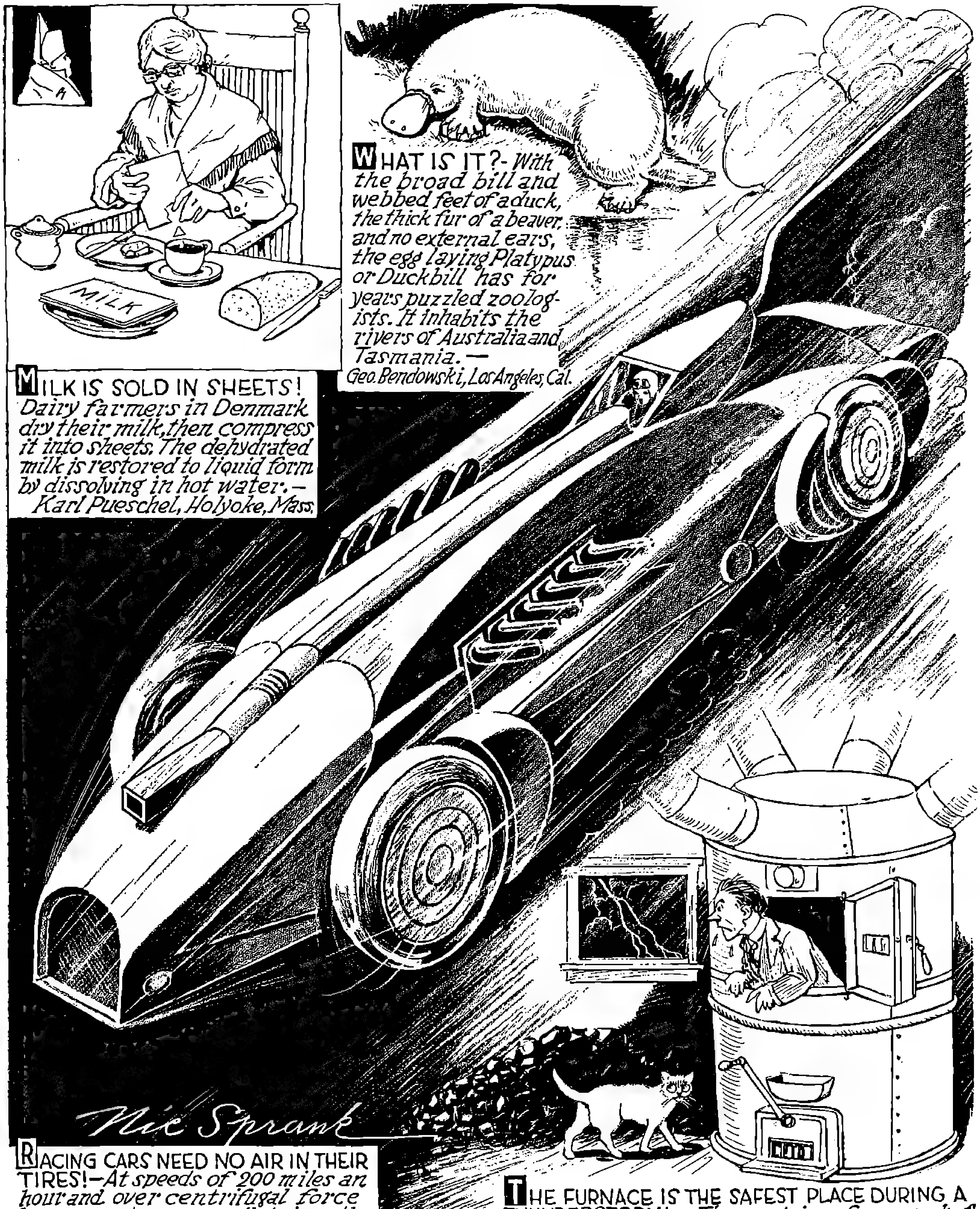


Photo shows safety bumper scooping up pedestrian. Note sturdy rail which provides hand-hold until car is stopped.

A NEW safety bumper which is expected to reduce the appalling number of injuries which result when pedestrians are struck by moving motor cars was recently demonstrated to delegates attending the convention of the International Association of Police Chiefs.

Resembling a huge metal grid, the safety bumper folds flat against the front of the car under normal operation. When engaged by an object or person, however, the grid drops, slanting downward at an angle which enables the device to scoop up the pedestrian.

RACING CAR TIRES *Need No Air*
Nic Sprank in ODDITIES *of* SCIENCE



MILK IS SOLD IN SHEETS! *Dairy farmers in Denmark dry their milk, then compress it into sheets. The dehydrated milk is restored to liquid form by dissolving in hot water.—Karl Pueschel, Holyoke, Mass.*

WHAT IS IT?—*With the broad bill and webbed feet of a duck, the thick fur of a beaver, and no external ears, the egg laying Platypus or Duckbill has for years puzzled zoologists. It inhabits the rivers of Australia and Tasmania.—Geo. Bendowski, Los Angeles, Cal.*

RACING CARS NEED NO AIR IN THEIR TIRES!—*At speeds of 200 miles an hour and over centrifugal force becomes strong enough to keep the tires inflated even after a blow-out.—Margaret Driver, Tarboro, N.C.*

THE FURNACE IS THE SAFEST PLACE DURING A THUNDERSTORM!—*The cast iron framework of the furnace will carry the lightning bolt safely around a person to the ground.—Doyle Peckemeyer, Patoka, Ill.*

Win $1! Send your Oddity of Science to Nic Sprank, Modern Mechanix and Inventions, 529 South 7th Street, Minneapolis. No Oddity will be considered unless source or proof of item is included. Do not include Oddities with letters.

RIDING the SKYWAYS

ALBERT WHITTED AIRPORT

Photo shows a modern barnstorming troupe—Mel Swanson's tri-motor, the sound car and stunt plane, a Waco J-6. This all-star outfit is known at airports from coast to coast.

Mel Swanson's famous group of flying stars in the shadow of the tri-motor. Left to right: Billy Morgan, Paul De Weiss, Mel Swanson, Virginia Whittlesey and the late Jerry Wessling, killed making a delayed chute jump at Floyd Bennett field just before he was to have rejoined Swanson's flying troupe as a parachute jumper for the 1934 summer season.

STRIVING for points of vantage, the crowd masses against the guard rail at the airport. Quickening curiosity marks every face. An air of expectancy hangs over the field. Even the local pilots have shut off their motors. America's ace barnstorming outfit is going into action. Mel Swanson and his Flying Stars are playing the field.

High in the sky—10,000 feet up—a man suddenly bails out of an airplane. A streak of white trails him as he drops, hurtling toward the crowd at the airport ramp. On the field a tarpaulin has been spread for a landing target.

"I'll bet anybody in the crowd five bucks that he lands withing fifty feet of the tarp!" barks a man with a megaphone.

There are no takers. The crowd has learned from experience that Mel Swanson's parachute men are among the best in the business.

The daring stunt man hurtles earthward. At a thousand feet—maybe five hundred—he pulls the ripcord.

Snap! And the parachute whips to a mushroom.

Then he flies the chute in toward the mark, not knowing how many dollars his chief may have placed on him; but seldom has he failed to hit terra firma more than an arm's reach from the tarp.

The cheers of the crowd have scarcely died away when the plane from which the stunt artist has leaped suddenly goes stark wild, like a thing flown by a demon.

Screaming chandelles, loops over and under, everything in the book from Immelmans to whipstalls are performed with such rapidity that spectators wonder what sort of flying fiend is at the stick.

With a final screaming dive that grips the stomachs of the spectators, the ship comes into the field. It taxies to the line and out steps little Virginia Whittlesey, age 24, America's premier woman stunt pilot. She is another member of Swanson's all-star cast.

Tricks of the Barnstorming Trade

What is this, you ask—a major air show? The answer is "No, just part of the daily program with a modern barnstorming outfit." By means of stunts like these, coupled with a keen knowledge of crowd psychology and sales ballyhoo, Mel Swanson, premier barnstormer, has built up a record of having flown more than 310,000 people—a greater number than any other man in the world. The stunts are a necessary part of Swanson's program.

The barnstorming business has changed since the old days when pilots hedge-hopped from one cabbage patch to another in antiquated Jennies, hoping to pick up an occasional five dollar bill. Delayed parachute leaps, autogyro stunting, aerial acrobatics and unbelievably large and interested crowds—these form the modern barnstorming picture in which chain store methods have capitalized the human urge to fly.

With Modern Barnstormers

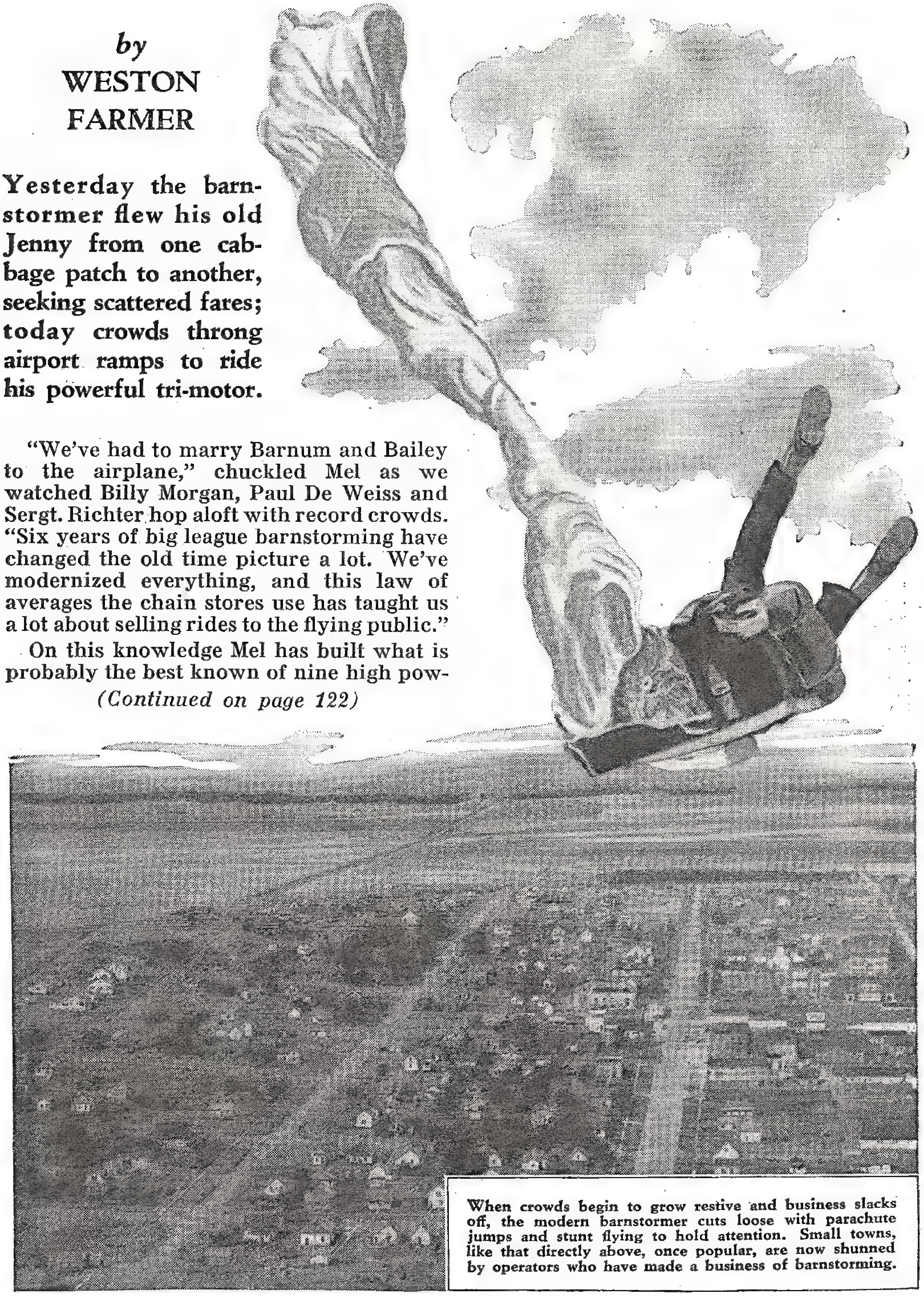
by
WESTON
FARMER

Yesterday the barnstormer flew his old Jenny from one cabbage patch to another, seeking scattered fares; today crowds throng airport ramps to ride his powerful tri-motor.

"We've had to marry Barnum and Bailey to the airplane," chuckled Mel as we watched Billy Morgan, Paul De Weiss and Sergt. Richter hop aloft with record crowds. "Six years of big league barnstorming have changed the old time picture a lot. We've modernized everything, and this law of averages the chain stores use has taught us a lot about selling rides to the flying public."

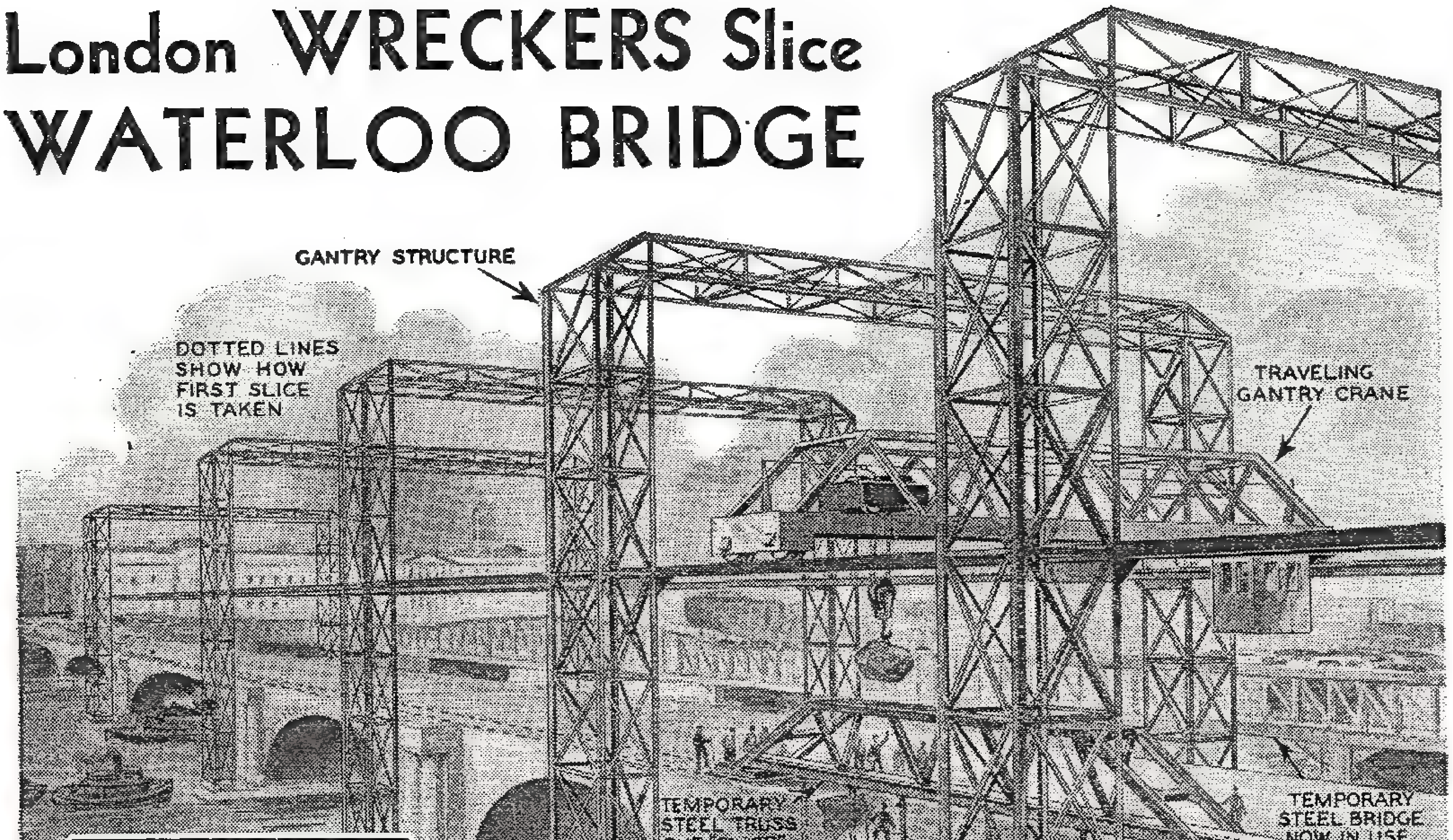
On this knowledge Mel has built what is probably the best known of nine high pow-

(Continued on page 122)

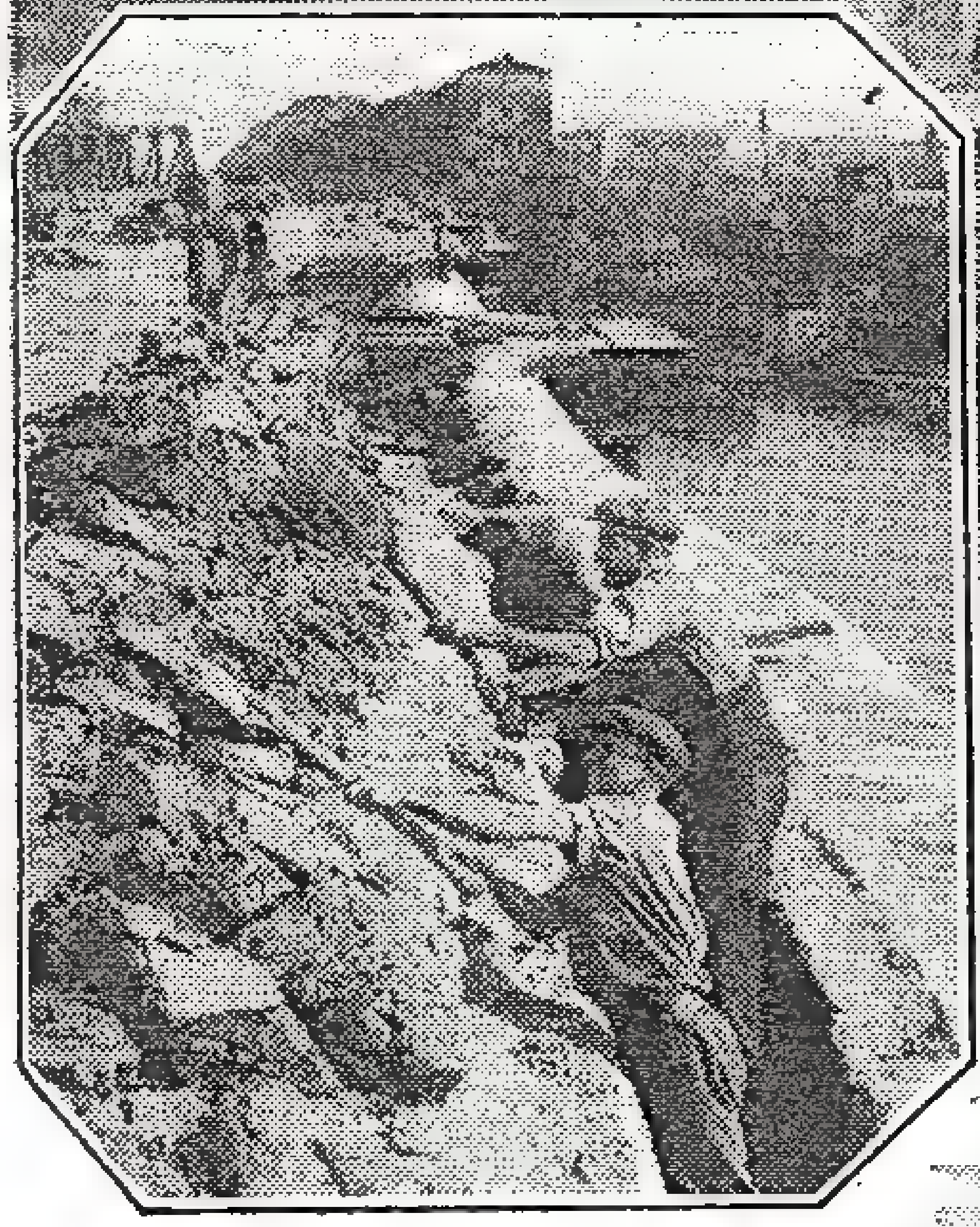


When crowds begin to grow restive and business slacks off, the modern barnstormer cuts loose with parachute jumps and stunt flying to hold attention. Small towns, like that directly above, once popular, are now shunned by operators who have made a business of barnstorming.

London WRECKERS Slice WATERLOO BRIDGE


GANTRY STRUCTURE
DOTTED LINES SHOW HOW FIRST SLICE IS TAKEN
TRAVELING GANTRY CRANE
TEMPORARY STEEL TRUSS ONE "SLICE" WIDE
TEMPORARY STEEL BRIDGE NOW IN USE
GANTRY STANDS ON BRIDGE PIERS
STEEL SUPPORTING ARCH

Huge gantry structure and arch-supporting trusses above are used in slicing the bridge.

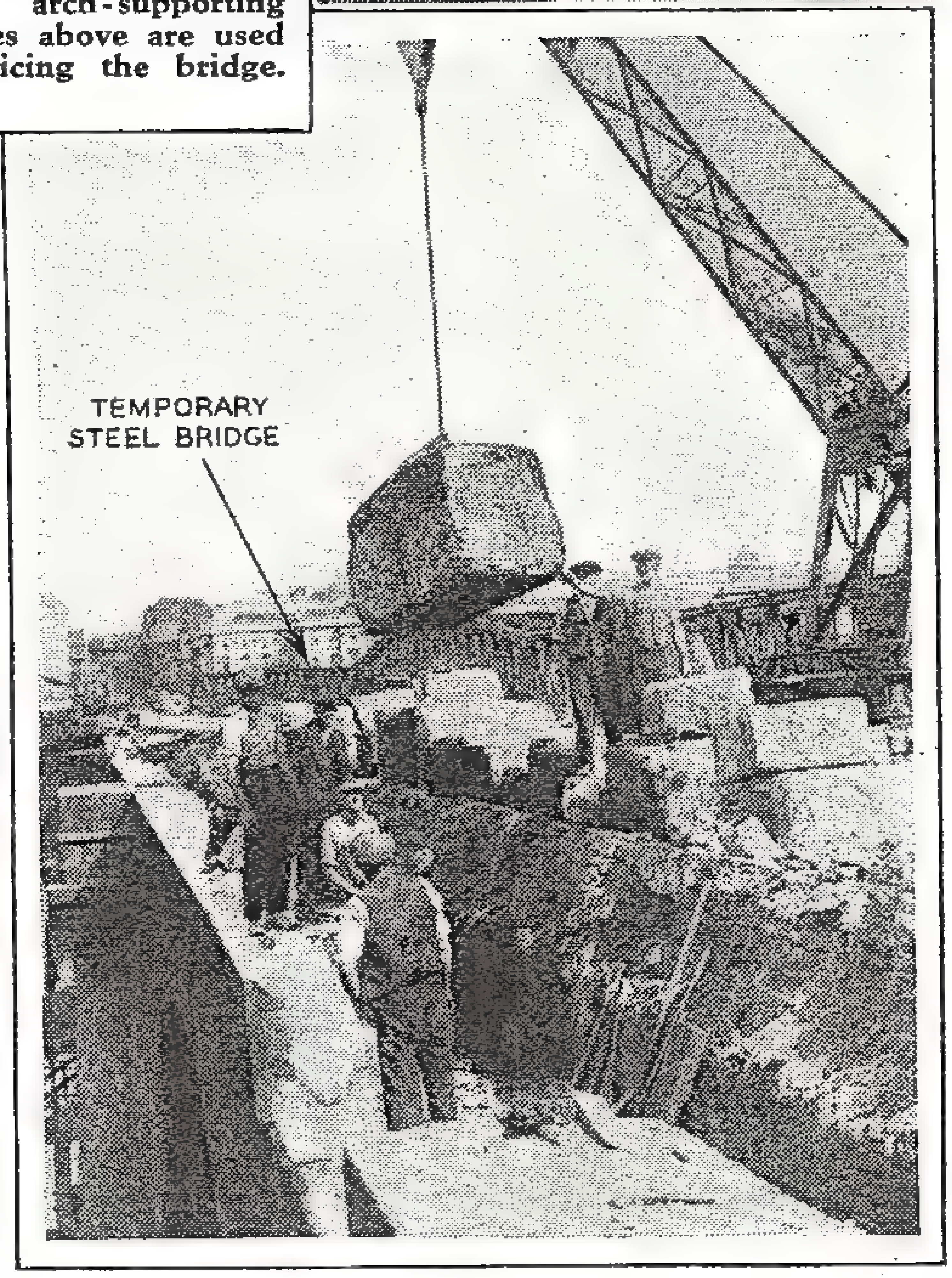


Beds of clay just above arches of Waterloo bridge have, after 123 years, become hard as iron and difficult to remove.

WATERLOO Bridge, London's poetic "Bridge of Sighs," is doomed! In one of the most difficult of modern-day wrecking attempts the massive granite arches are being taken down slice by slice, and temporary steel trusses erected to replace every stone which is removed.

This elaborate wrecking procedure is necessary since each arch is dependent for support upon all of the others. With ordinary wrecking methods, the entire bridge would crumble into the river, blocking the heavy river traffic if one were removed.

A huge gantry structure is being erected over the entire bridge, with foundations resting on the piers, to remove the heavy granite bridge blocks and bring the temporary steelwork into position. Starting at the center of the bridge, traveling gantry derricks will jerk out slices stone by stone.


TEMPORARY STEEL BRIDGE

Coping stones weighing one ton each are removed from parapet of Waterloo bridge by derricks. Arches are being taken apart in lengthwise slices, because of thrust of one arch against another. Wrecking will take over 18 months.

Stunt Artist Broadcasts Feelings During Parachute Jump

ALL the thrills of parachute jumping with none of its perils were recently experienced by spectators and radio listeners when Maximilian Skupin, stunt artist, broadcast his sensations while falling through space over the airport at Staaken, Germany.

In one hand Skupin held a short wave antenna composed of three metal blades criss-crossed to form a hexagon. Around his waist were strapped two carrying cases containing the transmitter and batteries. A small microphone similar to the mouthpiece used by switchboard operators was suspended just below his mouth. Skupin's body served as a counterpoise, or ground, for the unique experiment.

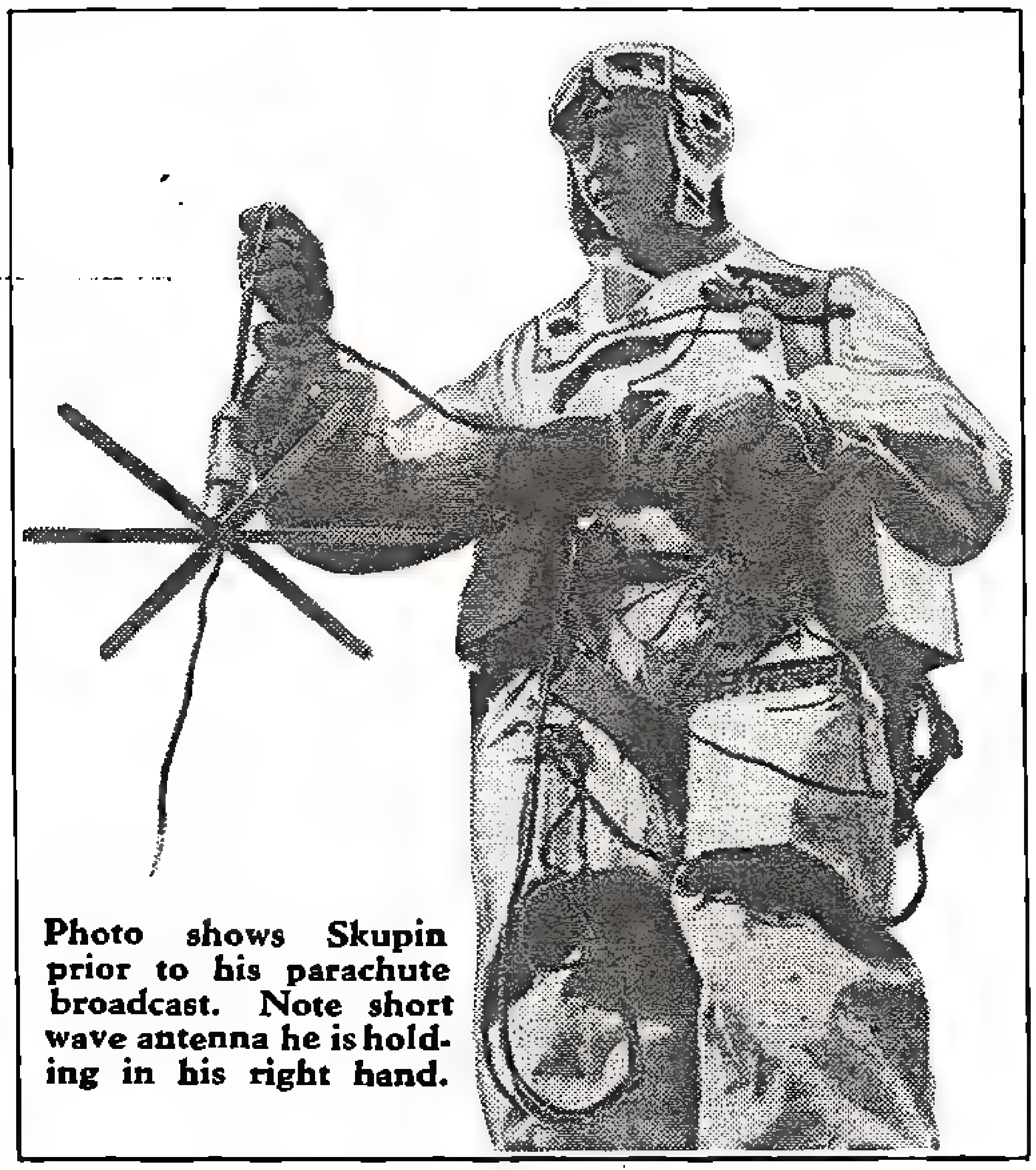
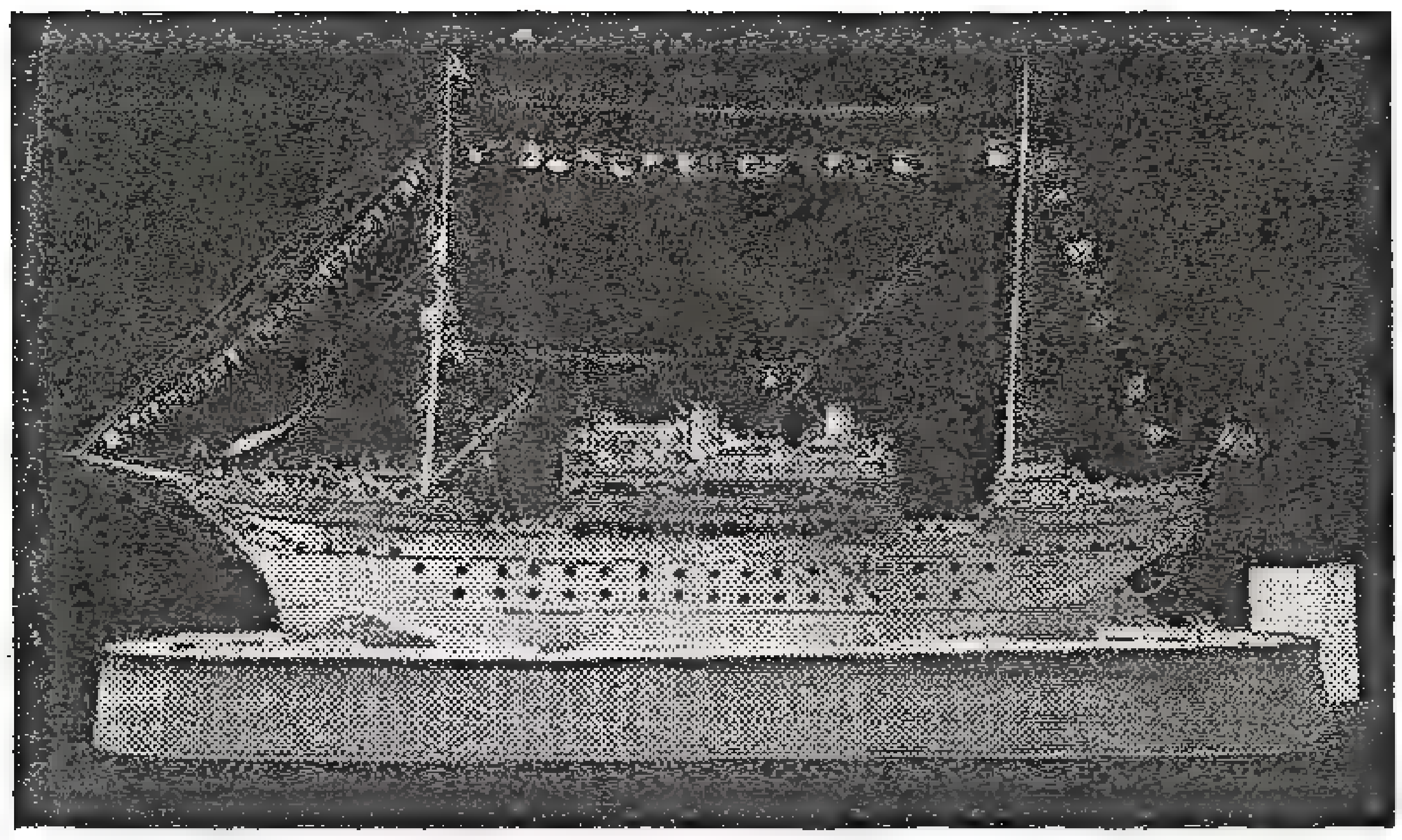


Photo shows Skupin prior to his parachute broadcast. Note short wave antenna he is holding in his right hand.

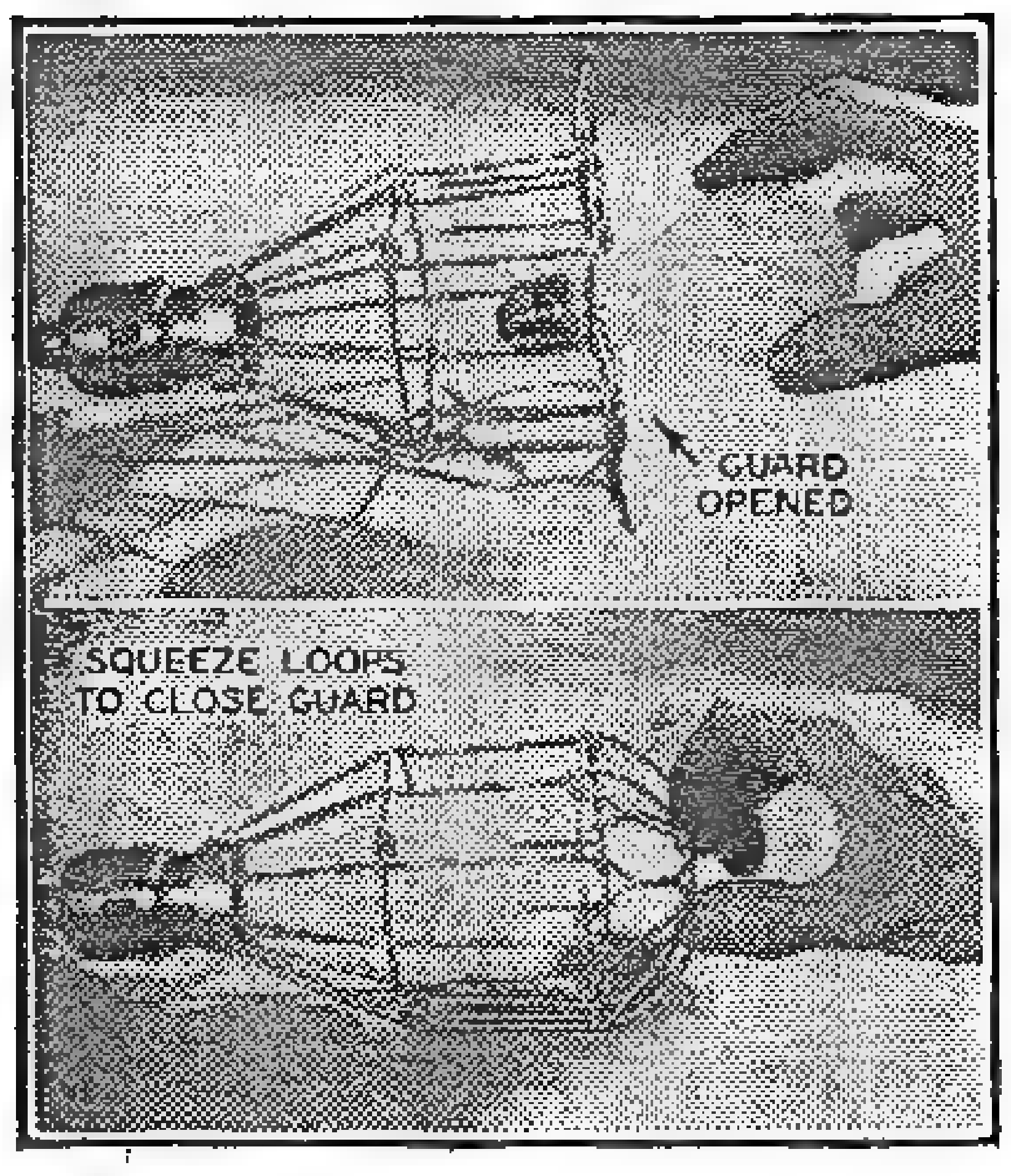
Craftsman Builds Steamer Model



More than six years of part-time work were required to build this model steamer, product of a Minneapolis man.

PERFECTLY scaled, down to the smallest detail, a beautiful model of the pleasure steamer, "Midnight Sun," was recently completed by H. H. Flescher, Minneapolis craftsman, after more than six years' spare time work. Seven feet long, the craft is lighted by electricity and carries eight lifeboats. More than 200 people are shown in action poses, including a ship's orchestra playing on the sun deck.

Easy Pressure Opens Lamp Guard



Note easy action of the improved wire lamp guard shown in photos.

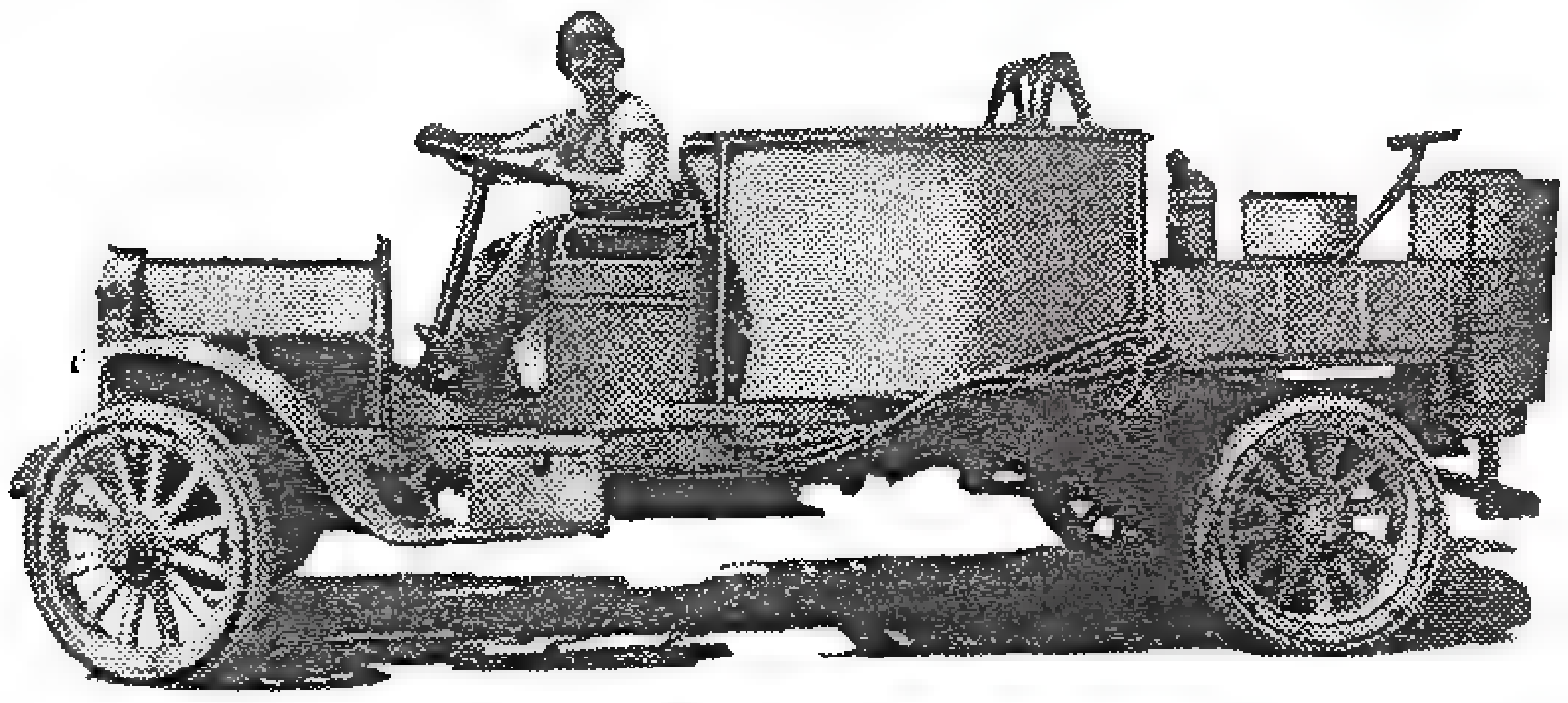
A NEW quick-opening lamp guard simplifies the task of changing bulbs in extensions and similar fixtures. Outward pressure on loops at end of guard causes them to swing open. Squeezing opposite loops together closes the guard.

Construct Fire Engine From Junk

UNWILLING to pay several thousand dollars for rural fire fighting equipment, citizens of the Wilton district, near Sacramento, California, pooled their mechanical resources and built a fire engine from scrap parts and salvage from junk piles at a cost of only $47.41.

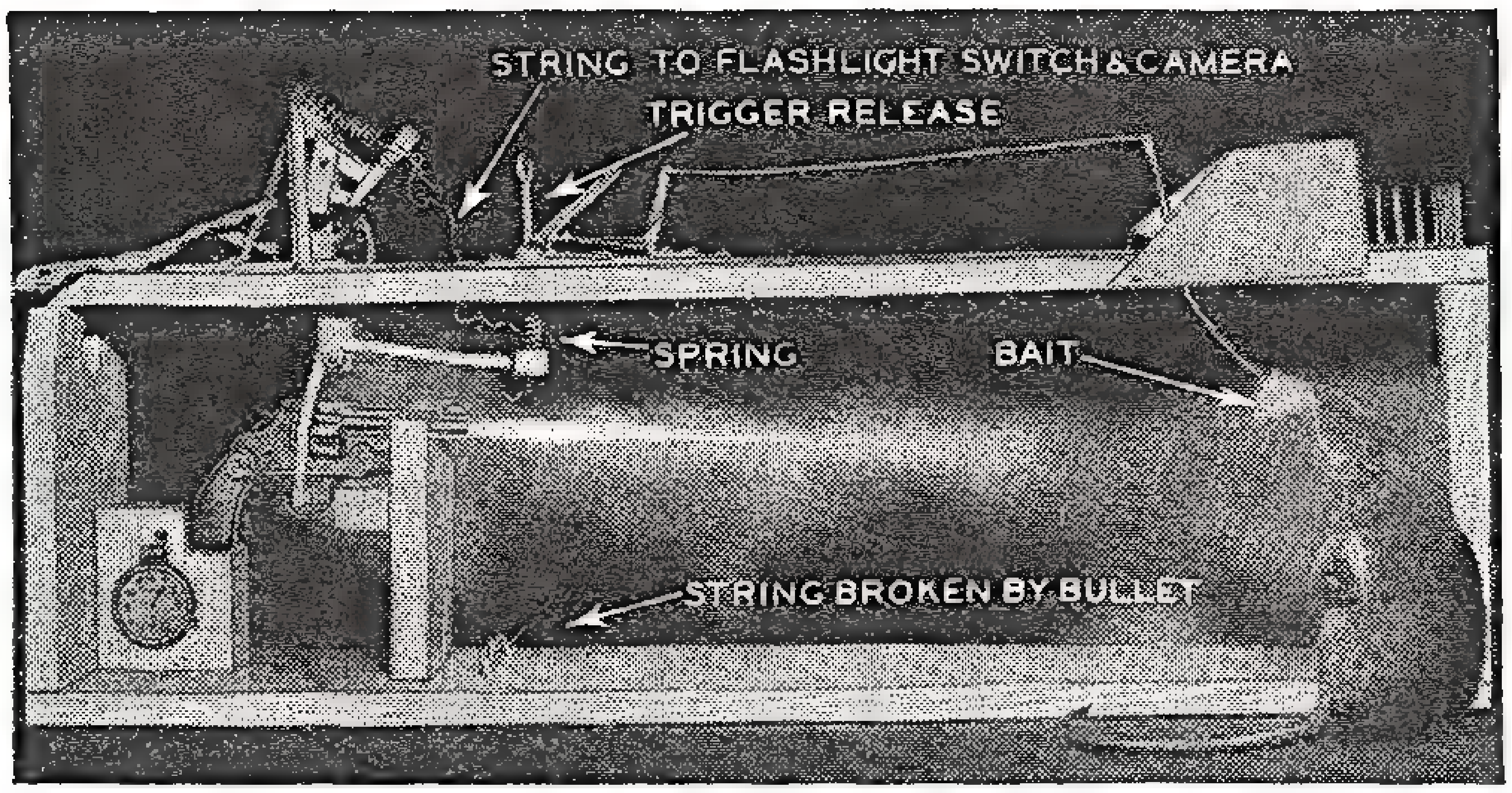
The problem of transporting water tanks and equipment was speedily solved by the acquisition of an old truck which had been discarded as junk. A small cash outlay plus a little garage work put it in running order. A discarded 500-gallon water tank and an old two-man pressure pump were found and were likewise reconditioned and placed on the truck after a small amount of labor had put them in efficient running order.

A place was provided for two additional 40-gallon water tanks for bucket use, plus racks for extinguishers, brooms, rakes, axes and other accessories. All of this equipment has been installed on the $47 fire engine, whose accomplishments are said to equal those of machines ranging up to $4,000 in cost.



A little labor and $47.41 in cash built this home-made fire engine near Sacramento, California. The truck, water tanks, pump and tools were salvaged from the junk pile.

Trapped Rat Shoots Self and Photographs the Fatal Event



Copyright, G. W. Fenner.

Photo shows ingenious trap in which rat shot and photographed himself. Note how rat's pulling upon the bait tripped the gun trigger. The bullet then cut the string, as indicated, to set off the flashlight charge.

TRAPPED in an ingenious contrivance built by George W. Fenner, Syracuse photographer, a hungry rat shot himself and left a picture of the event in a camera trained upon the device.

A piece of bait was suspended from a wire at one end of the trap. Nibbling eagerly at the bait, the rat released a catch which dropped a spring-operated hammer, tripping the trigger of a revolver mounted at the opposite end of the trap.

The shot not only killed the rat but also cut a piece of string connected with still another spring. The latter set off a flashlight, supplying the illumination necessary to take the picture. In addition to the camera and lethal apparatus, a watch hung near the gun recorded the time of shooting.

Photocell Is Lightning Arrester

WHEN lightning strikes radio station WLW's 831-foot antenna tower, thus grounding the entire transmitter, a photocell trained on a discharge gap at the foot of the tower catches the flash.

Complicated relay mechanisms and circuit breakers respond to the electric eye's danger call, and shut off the transmitter's power for a split second to extinguish the "power follow-up arc." Were this not eliminated, virtually all of the station's 500,000 watts of power would drain from the tower into the earth.

The station is off the air for so short an interval that radio listeners never know just when their program is being interrupted by lightning. Day and night this light-sensitive mechanism stands guard, keeping radio "on the air."

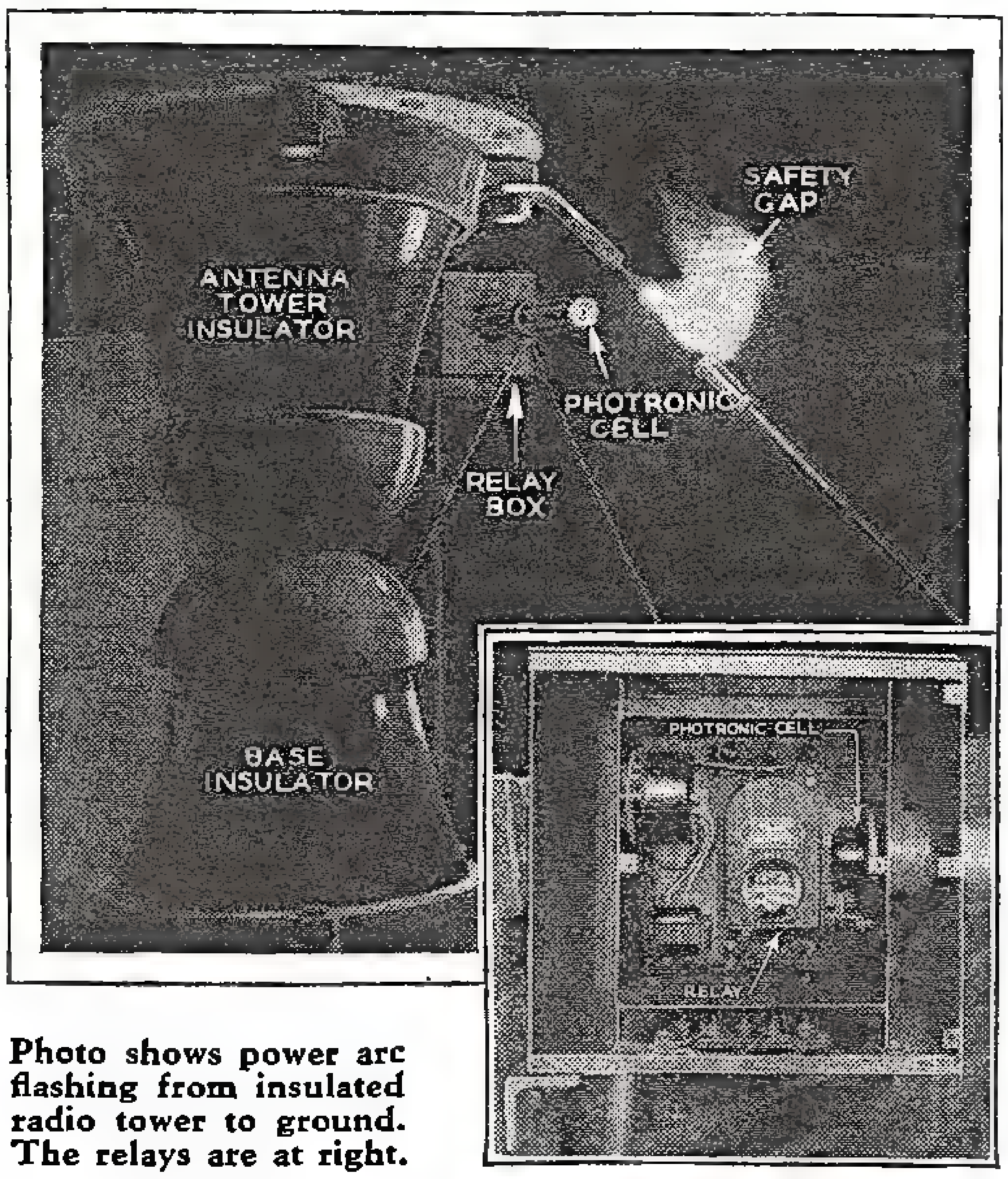
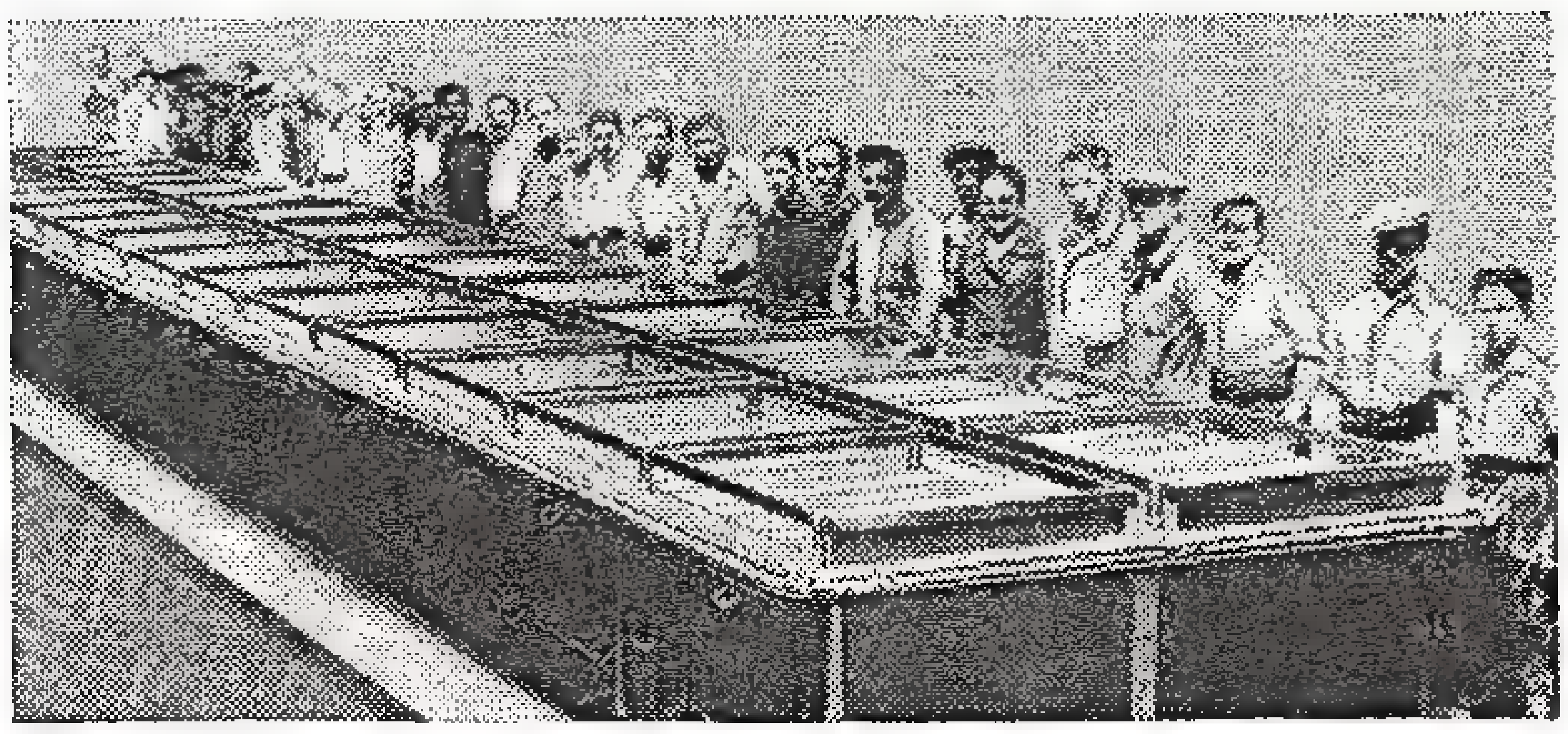


Photo shows power arc flashing from insulated radio tower to ground. The relays are at right.

New Liner Boasts Mammoth Range

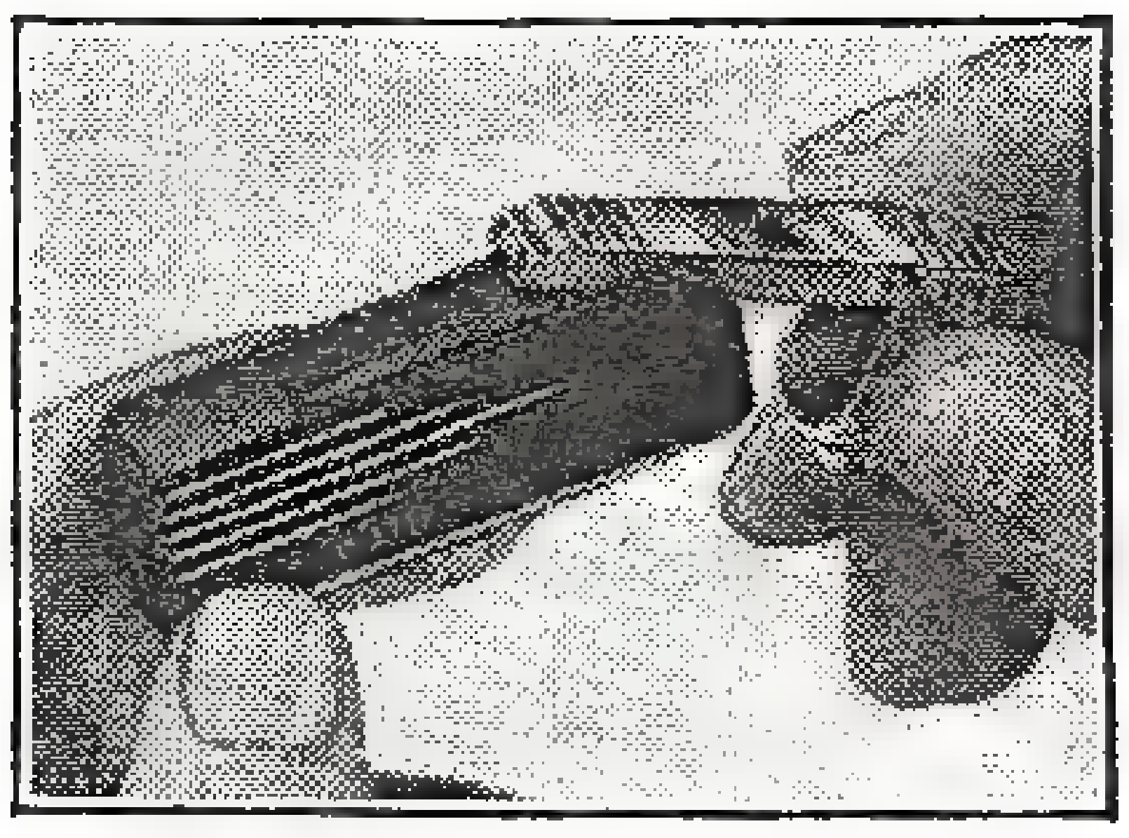


The huge electric range recently installed in the French liner, Normandie, accommodates 35 workmen along its side.

ONE of the world's largest electric ranges was recently installed in the vast kitchen of the giant French liner, *Normandie,* now nearing completion at St. Nazaire. The stove is large enough to permit thirty-five men to stand along one of its huge sides without crowding.

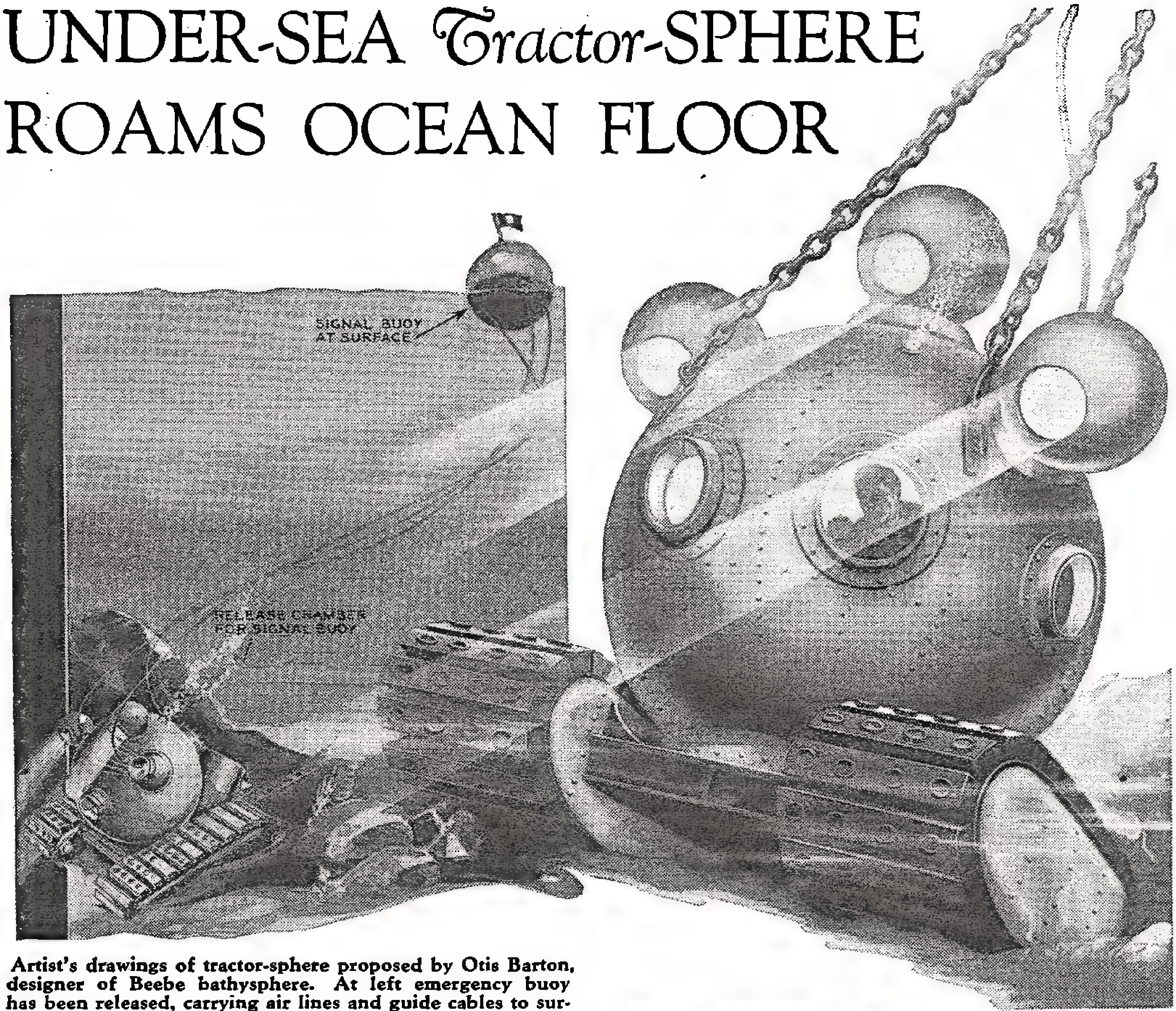
Lighter Operates Without Flame

A FIRE without a flame is a novel feature of a new cigaret lighter. A single motion is said to produce a spark which turns into a deep red glow. The case is made of molded bakelite and is fitted with a chromium plated device for scratching. The lighter performs well in a wind.



A single motion produces a glow but not a flame in this lighter. Note convenient size.

UNDER-SEA *Tractor*-SPHERE ROAMS OCEAN FLOOR


SIGNAL BUOY AT SURFACE
RELEASE CHAMBER FOR SIGNAL BUOY

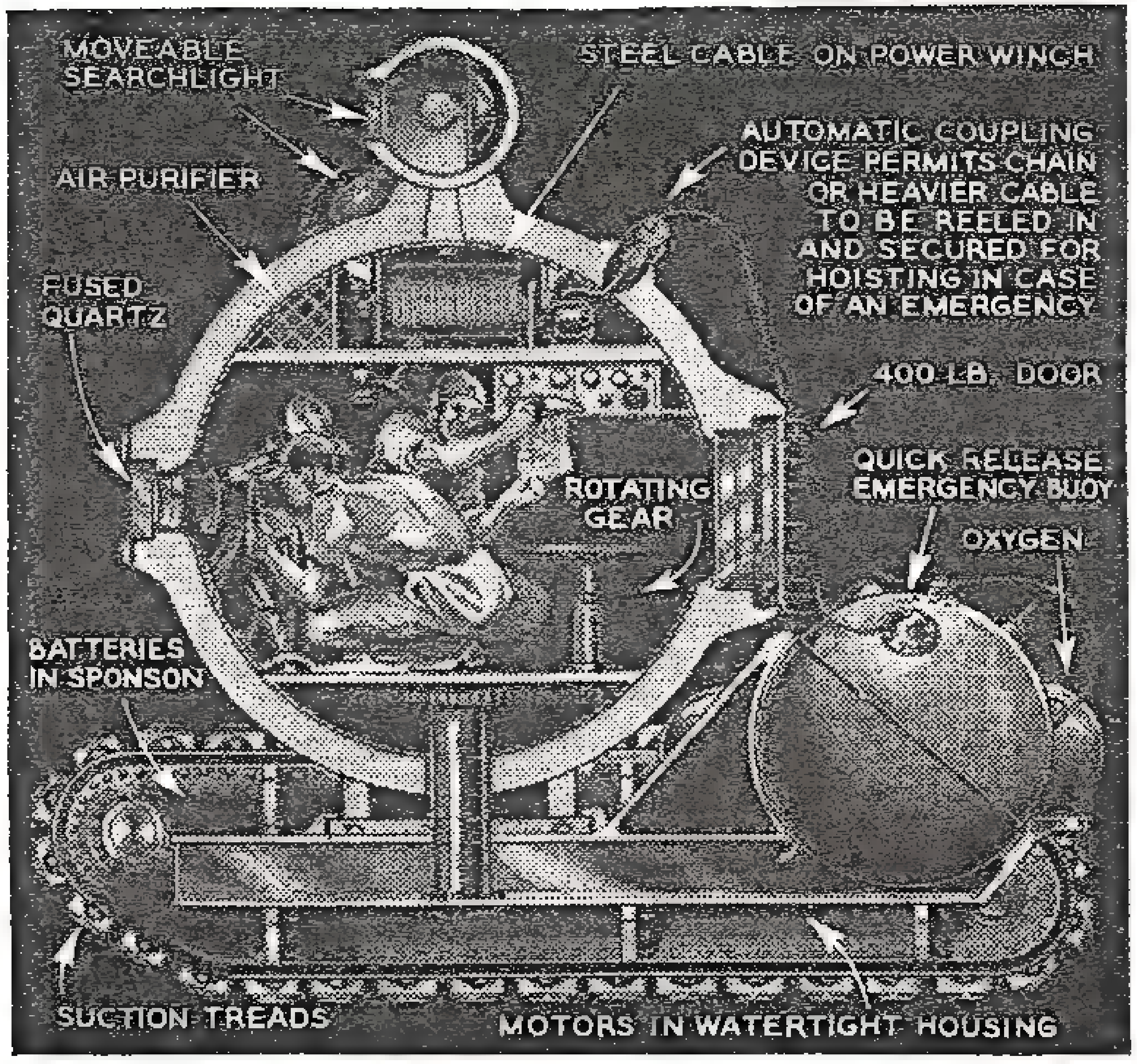
Artist's drawings of tractor-sphere proposed by Otis Barton, designer of Beebe bathysphere. At left emergency buoy has been released, carrying air lines and guide cables to surface. At right chains have been lowered for hoisting sphere.

NEWEST of mechanical monsters intended for under-sea exploration is the tractor-sphere being designed by Otis Barton, builder of the bathysphere used by Dr. William Beebe in setting a new world's diving record of 3028 feet.

The new invention, intended to be driven into the sea from the beach level under its own power, might be classed as a bathysphere mounted on caterpillar treads. Powerful electric motors operating from sealed-in storage batteries would move this under-sea tractor over the rocky slopes and pinnacles of the ocean floor.

Under ordinary conditions there would be no contact with vessels at the surface as the tractor-sphere roamed about the ocean bottom. In case of emergencies such as engine failure a large buoy would be released, carrying airlines to the surface. Hoisting cables could then be slipped down the guide cables to the automatic chain-coupling devices on the sphere itself. Sphere, tractor, and all would then be hauled on board the ship for repairs.

Where oceanic explorations are to be made some distance from shore, ships would carry the tractor-sphere to the selected location, lower it to the bottom, then release the chains to permit unhampered exploration. Short wave radio would then keep the explorers in constant communication with those aboard the ship, and the buoy released with completion of the work.


MOVEABLE SEARCHLIGHT
STEEL CABLE ON POWER WINCH
AIR PURIFIER
AUTOMATIC COUPLING DEVICE PERMITS CHAIN OR HEAVIER CABLE TO BE REELED IN AND SECURED FOR HOISTING IN CASE OF AN EMERGENCY
FUSED QUARTZ
400 LB. DOOR
ROTATING GEAR
QUICK RELEASE EMERGENCY BUOY
OXYGEN
BATTERIES IN SPONSON
SUCTION TREADS
MOTORS IN WATERTIGHT HOUSING

Cross-section of tractor-sphere shows arrangement of interior, location of motors, emergency buoy, and cable reel.

SPORTSMEN'S

For Thrilling SPORT

by CAPT. W. H. FAWCETT

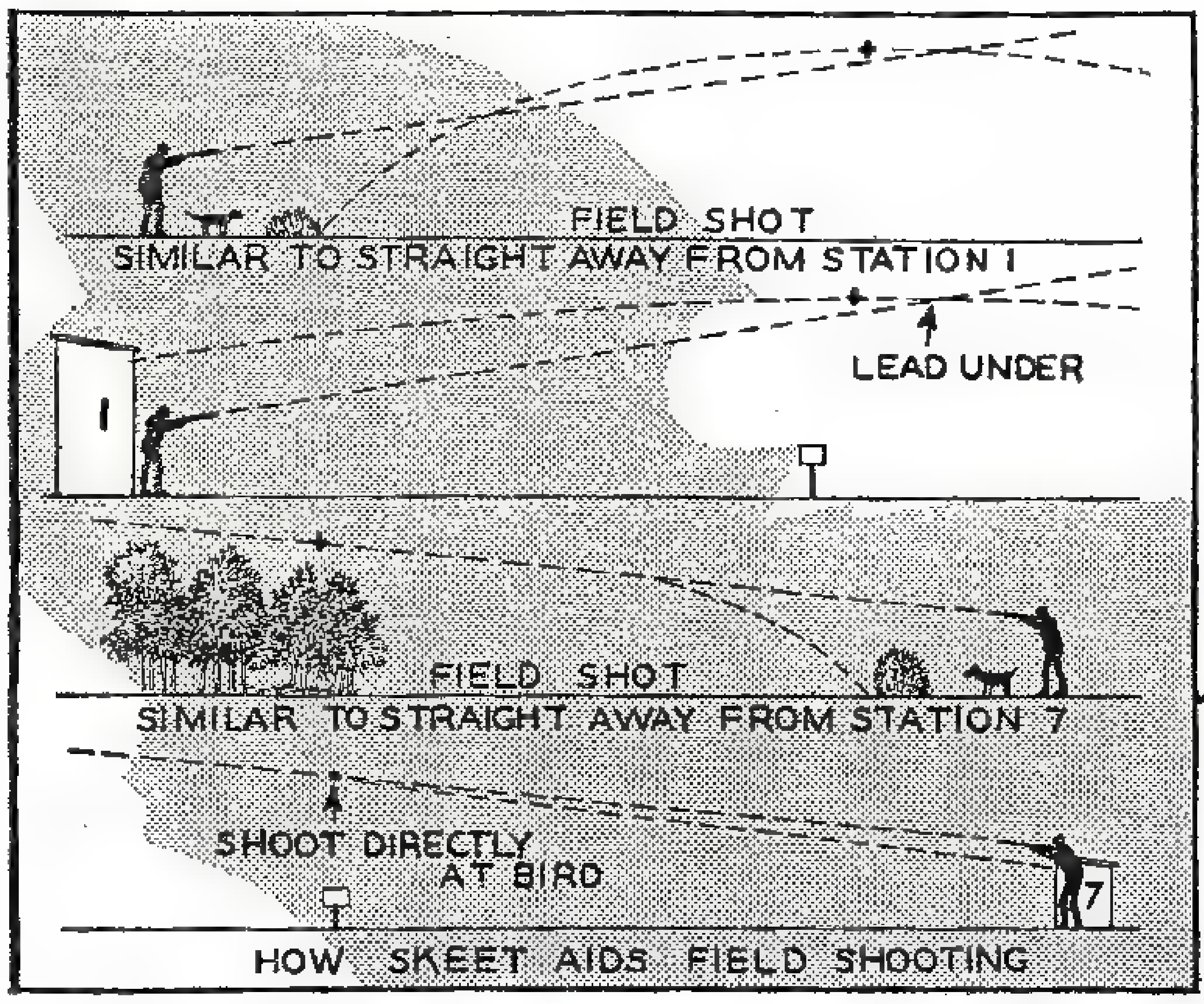
Noted Publisher, Sportsman, Manager and Member of 1924 Champion American Olympic Trapshooting Team

THE history of the new national sport of skeet is a record of amazing progress. From its inception in 1920 on the grounds of the Glen Rock Kennels in Andover, Mass., clubs have sprung up all over the United States. Today, one will find skeet being shot even in the smallest of hamlets.

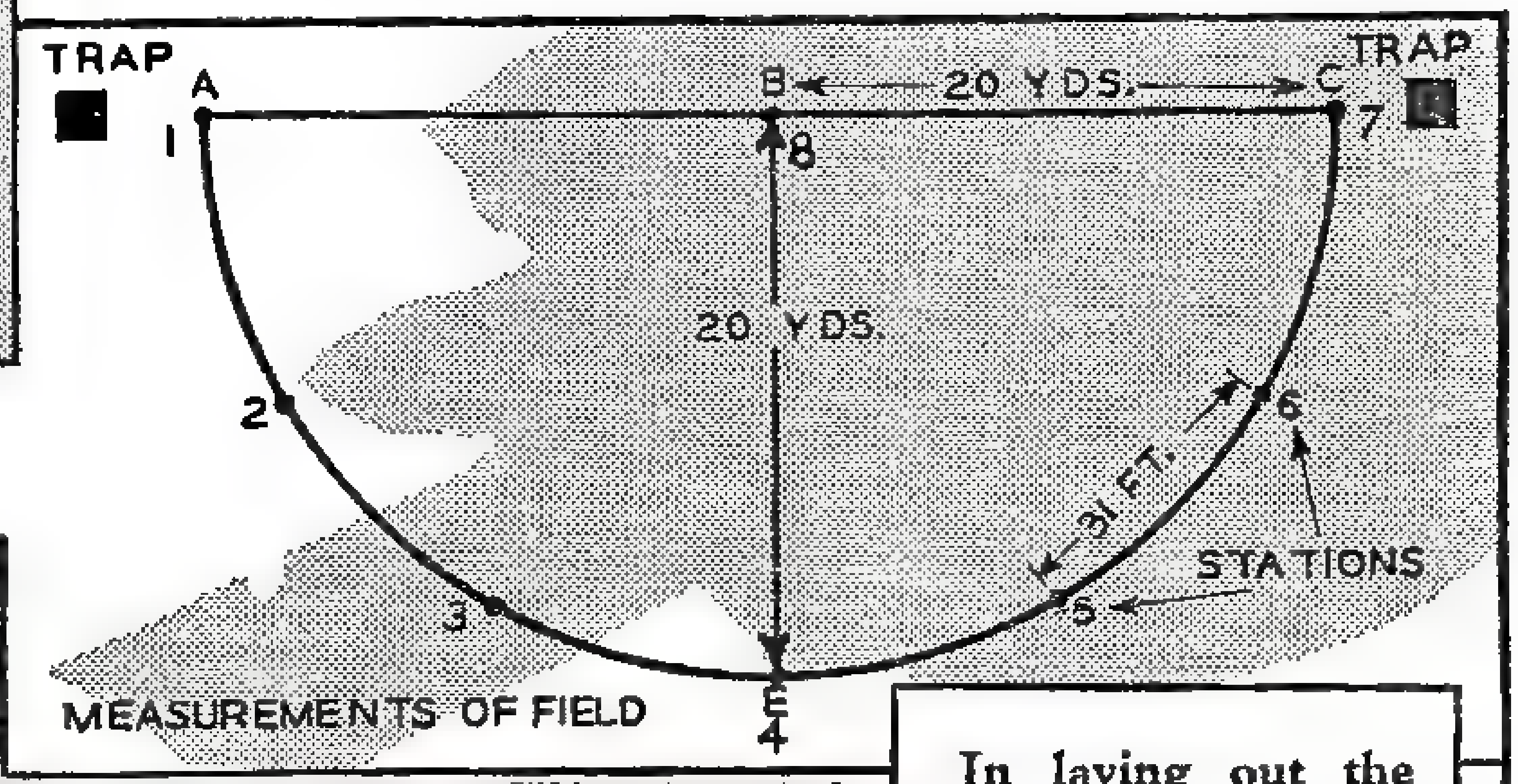
Skeet, which gets its name from an old Scandinavian form of the word "shoot," has already gone far beyond its sponsors' expectations. There are several reasons for this, mainly, because the average hunter wanted some form of wing shooting to test his skill and, incidentally, afford practice during the off months when he, or she, wasn't allowed by law to hunt game. The factor of chance and ego also play a large part in the popularity of this new and exciting sport.

We glean from the Official Skeet Rule and Handbook published by the National Skeet Shooting Association, Inc., of Boston, Mass., the following interesting facts.

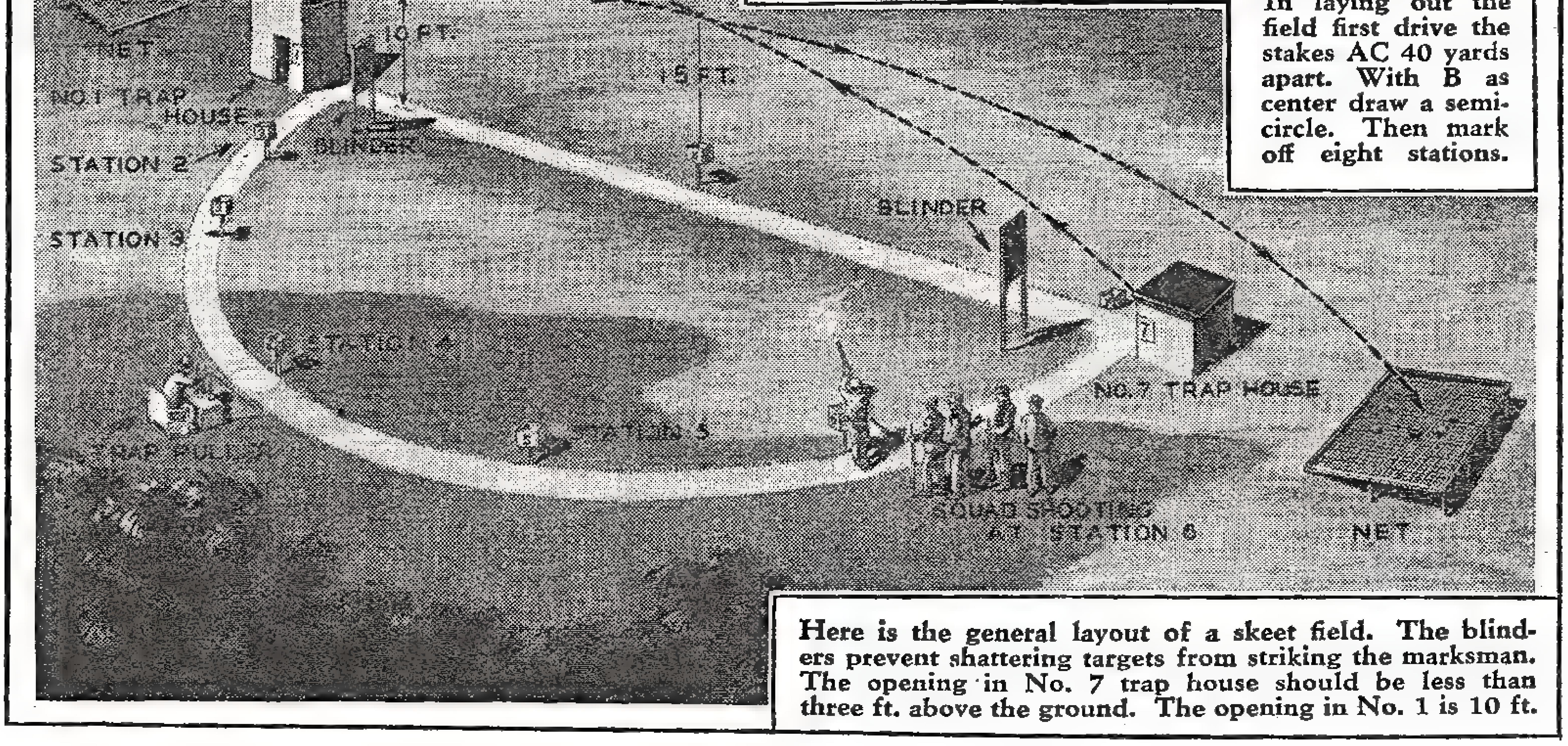
Safety is the first and greatest considera-


FIELD SHOT
SIMILAR TO STRAIGHT AWAY FROM STATION 1
LEAD UNDER
1
FIELD SHOT
SIMILAR TO STRAIGHT AWAY FROM STATION 7
SHOOT DIRECTLY AT BIRD
7
HOW SKEET AIDS FIELD SHOOTING

Skeet will improve your marksmanship. The speed and angle of targets resemble field conditions.


TRAP
A
1
B
20 YDS.
C
TRAP
7
8
20 YDS.
2
6
31 FT.
STATIONS
3
5
4
MEASUREMENTS OF FIELD

In laying out the field first drive the stakes AC 40 yards apart. With B as center draw a semicircle. Then mark off eight stations.


NET
NO. 1 TRAP HOUSE
10 FT.
15 FT.
STATION 2
BLINDER
STATION 3
BLINDER
STATION 4
7
NO. 7 TRAP HOUSE
TRAP PULLER
STATION 5
SQUAD SHOOTING AT STATION 6
NET

Here is the general layout of a skeet field. The blinders prevent shattering targets from striking the marksman. The opening in No. 7 trap house should be less than three ft. above the ground. The opening in No. 1 is 10 ft.

Start a SKEET CLUB

Lay out a skeet field and try this fascinating shooting game. You will forget golf, bridge, and meals attempting to chalk up a better score. Here are good pointers from an outstanding leader in the sport.

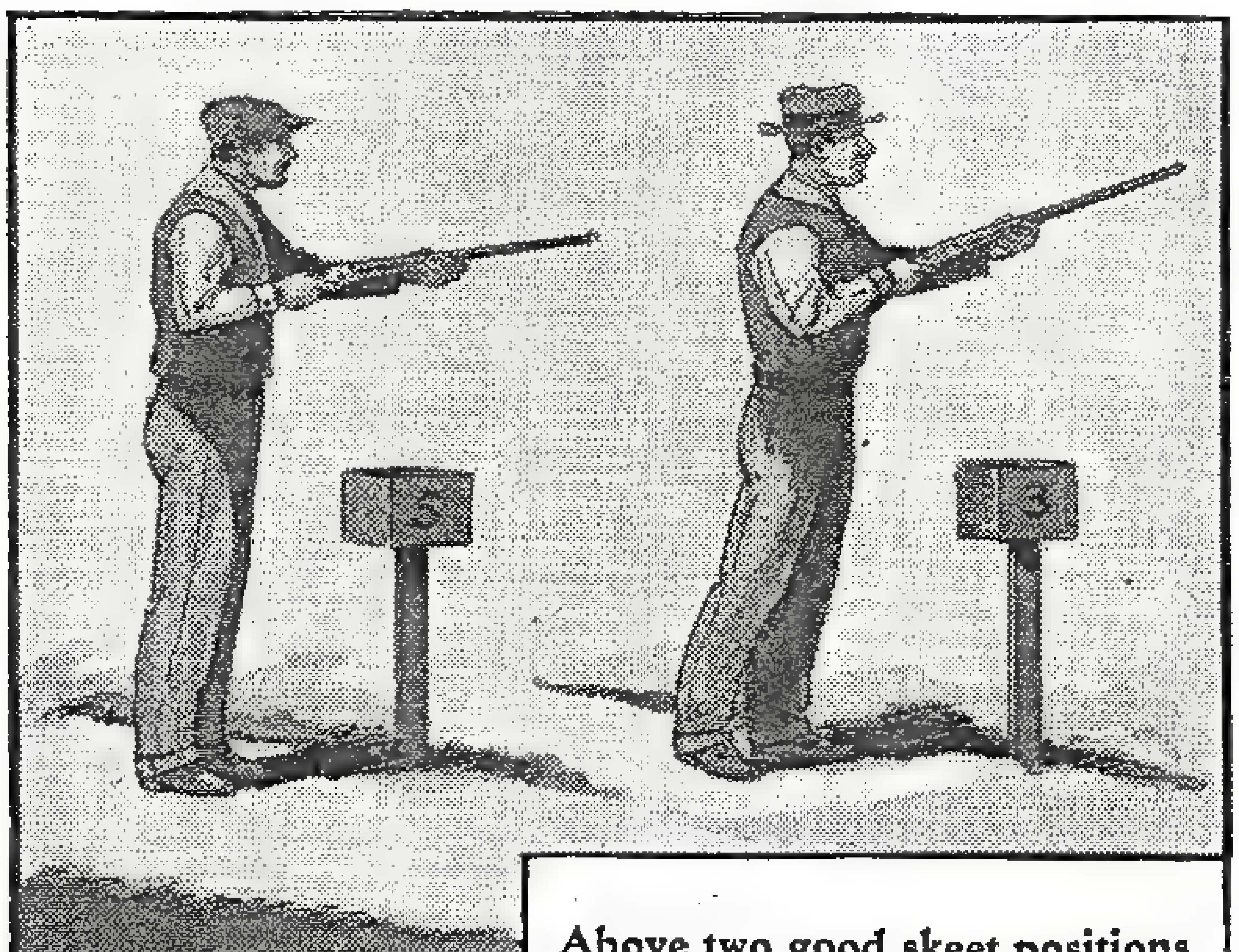
tion when choosing a skeet field. Therefore, a liberal allowance should be granted for the range of the guns. It is estimated that the danger zone measures 300x600 yards so that your field should be considerably larger than this area.

Laying Out the Skeet Field

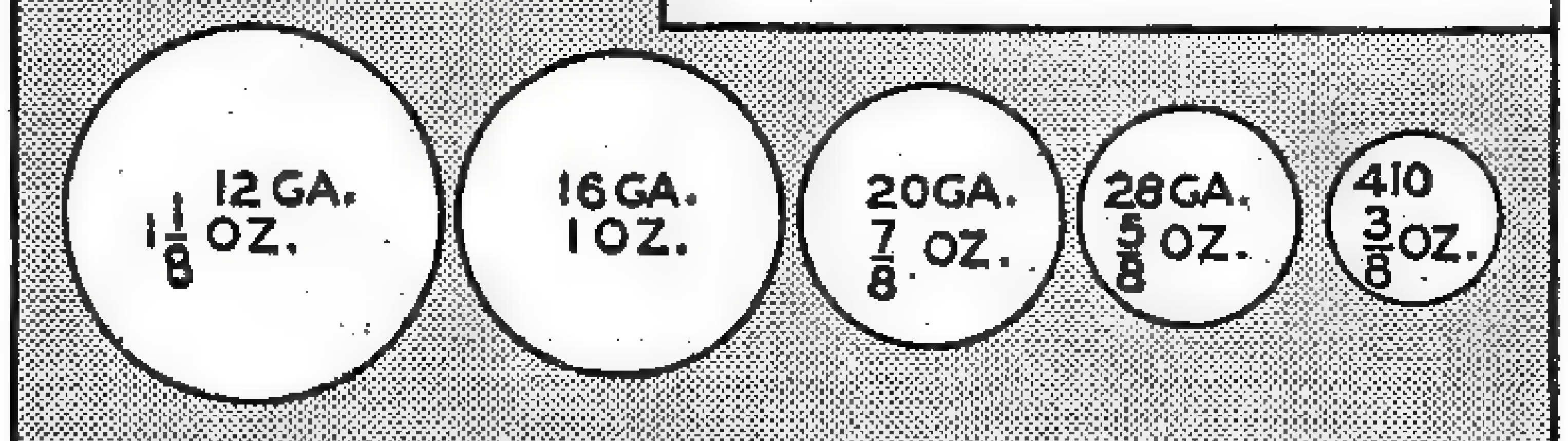
A skeet target, similar to those thrown in the companion sport of trapshooting, is smaller and, consequently, harder to hit than a game bird flying at equal speed. For this reason, it is advisable to have a clear sky background.

In laying out the field, drive two stakes 40 yards apart, as shown in diagram labeled AC. The line that connects these stakes should run northwest by southwest as, ordinarily, the light is better when shooting toward the northeast. Stake B should be

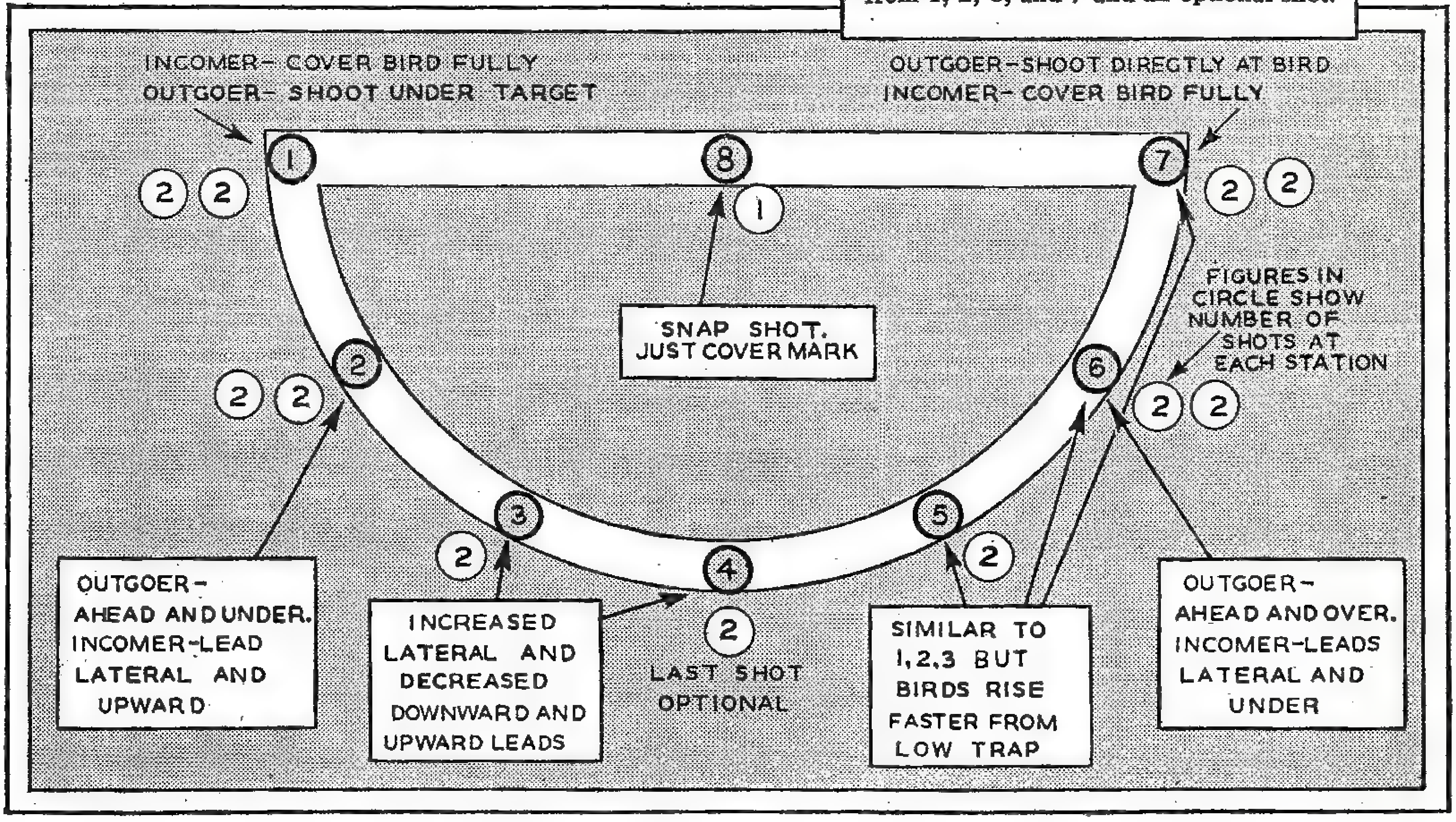
(Continued on page 130)



Above two good skeet positions are shown. Don't lean over on your stock, but stand with the shoulders leaning forward. Keep head in vertical position.


12 GA. 1 1/8 OZ.
16 GA. 1 OZ.
20 GA. 7/8 OZ.
28 GA. 5/8 OZ.
410 3/8 OZ.

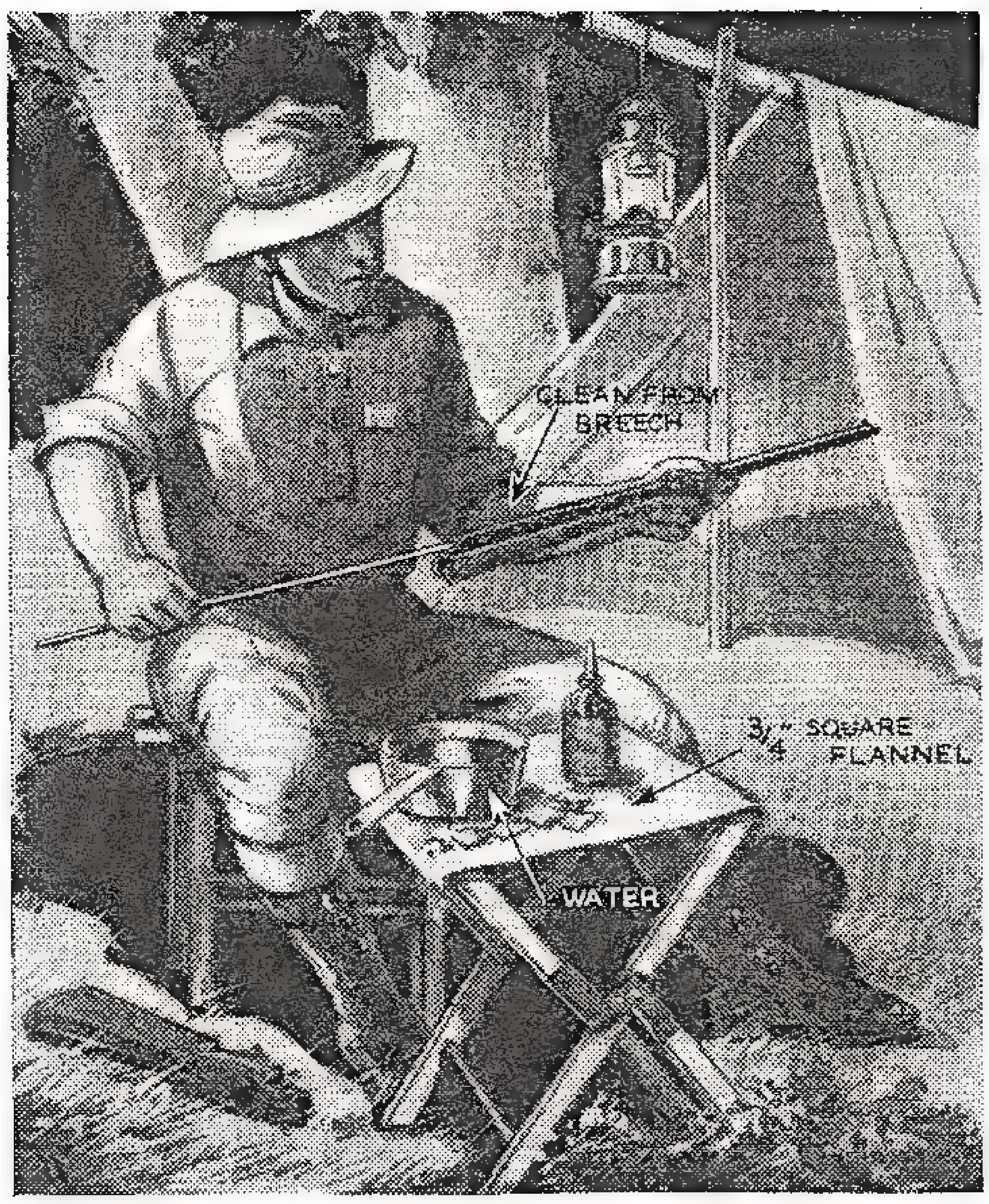
Above are the relative shot patterns of different gauge guns. Proper leads are given below. Two singles are first shot from 8 stations, then 4 sets of doubles from 1, 2, 6, and 7 and an optional shot.


INCOMER– COVER BIRD FULLY
OUTGOER– SHOOT UNDER TARGET
OUTGOER–SHOOT DIRECTLY AT BIRD
INCOMER– COVER BIRD FULLY
1
8
7
2 2
1
2 2
SNAP SHOT. JUST COVER MARK
FIGURES IN CIRCLE SHOW NUMBER OF SHOTS AT EACH STATION
2
6
2 2
2 2
3
5
4
2
2
2
OUTGOER– AHEAD AND UNDER. INCOMER–LEAD LATERAL AND UPWARD
INCREASED LATERAL AND DECREASED DOWNWARD AND UPWARD LEADS
LAST SHOT OPTIONAL
SIMILAR TO 1,2,3 BUT BIRDS RISE FASTER FROM LOW TRAP
OUTGOER– AHEAD AND OVER. INCOMER–LEADS LATERAL AND UNDER

SPORTSMEN'S

Advantages of .22 Rifles for Hunting

by ROBERT PAGE LINCOLN



If possible clean rifle from breech as shown here. Run water soaked flannels through first, then dry and follow with oiled flannels. Grease gun until ready to be used.

THE .22 caliber rifle in its many patterns and makes is one of the most popular guns in North America. All other makes of guns in the world could not begin to come up to the total number of these popular small bore rifles now in use.

Undoubtedly when the .22 caliber rifle was first made in this country it was considered as fitted for the boy only. However, its popularity grew rapidly among adult hunters as well as boy hunters. As a result the gun makers set about perfecting the gun and the demand for the .22 increased. Today we have guns in this class that are far more accurate and powerful than the .22 of the past.

At the present time the .22 brass cartridge case has been perfected to the point where a pressure of upwards of 24,000 pounds to the square inch may be exerted. The .22 long rifle cartridge, loaded with modern smokeless powder, has a muzzle velocity of well over 1000 feet per second, and will carry up to 1400 yards. This cartridge is accurate up to 200 yards and close in the bullet will go through five pine boards.

There are three varieties of .22 cartridge, the Short, the Long and the Long Rifle. The .22 Short cartridge is the one most consistently in use. Since it is accurate up to 25 yards or more it is ideal for squirrels, rabbits and other game that may be shot within comparatively close range. It is more nearly the kind of ammunition the boy should use, especially in well settled sections. At that, the extreme, uninterrupted range of the .22 Short is 1000 yards.

It has been stated that .22 Long is likely to become obsolete, with the Long Rifle taking its place. The .22 Long Rifle cartridge is used extensively in target work. It is considered one of the best vermin cartridges, especially when hollow point bullets are used. Many men in the woods are using the hollow point .22 L. R. cartridge in killing deer, a practice that is not to be commended, although if a vital spot is reached this bullet will down a deer with ease. The trouble with using the .22 on big game is that it often cruelly wounds the animal, leaving him to suffer for days.

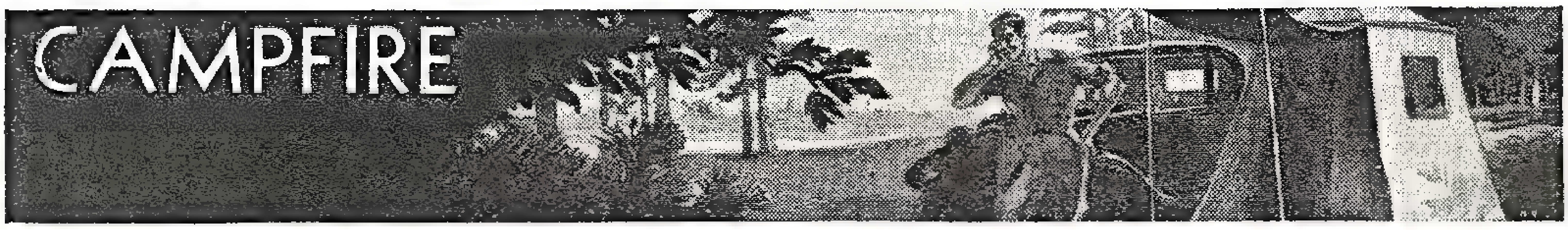
Greased or Greaseless Bullets?

Shoot the kind of shell your gun calls for. It should be understood that these guns are chambered to take the .22 Short, the .22 Long or the .22 Long Rifle cartridge, and as they are chambered, for that one cartridge and that only they should be used. To attempt to use the wrong cartridge may lead to damaging the rifling and injuring the accuracy of the rifle.

Whether greased or greaseless bullets are best to use in the .22 is a subject of contention. Some claim the greased bullet prolongs the life of the barrel because of the grease protection. This may be true, but the practice of dumping greased bullets into hunting coat pockets, there to gather dirt, dust and lint, and then shoving them into the gun uncleaned, is certainly far from beneficial. As opposed to this the dry, ungreased shells may be kept in the pocket without encountering such conditions.

To properly clean your rifle use the new water method. Run a flannel patch that has

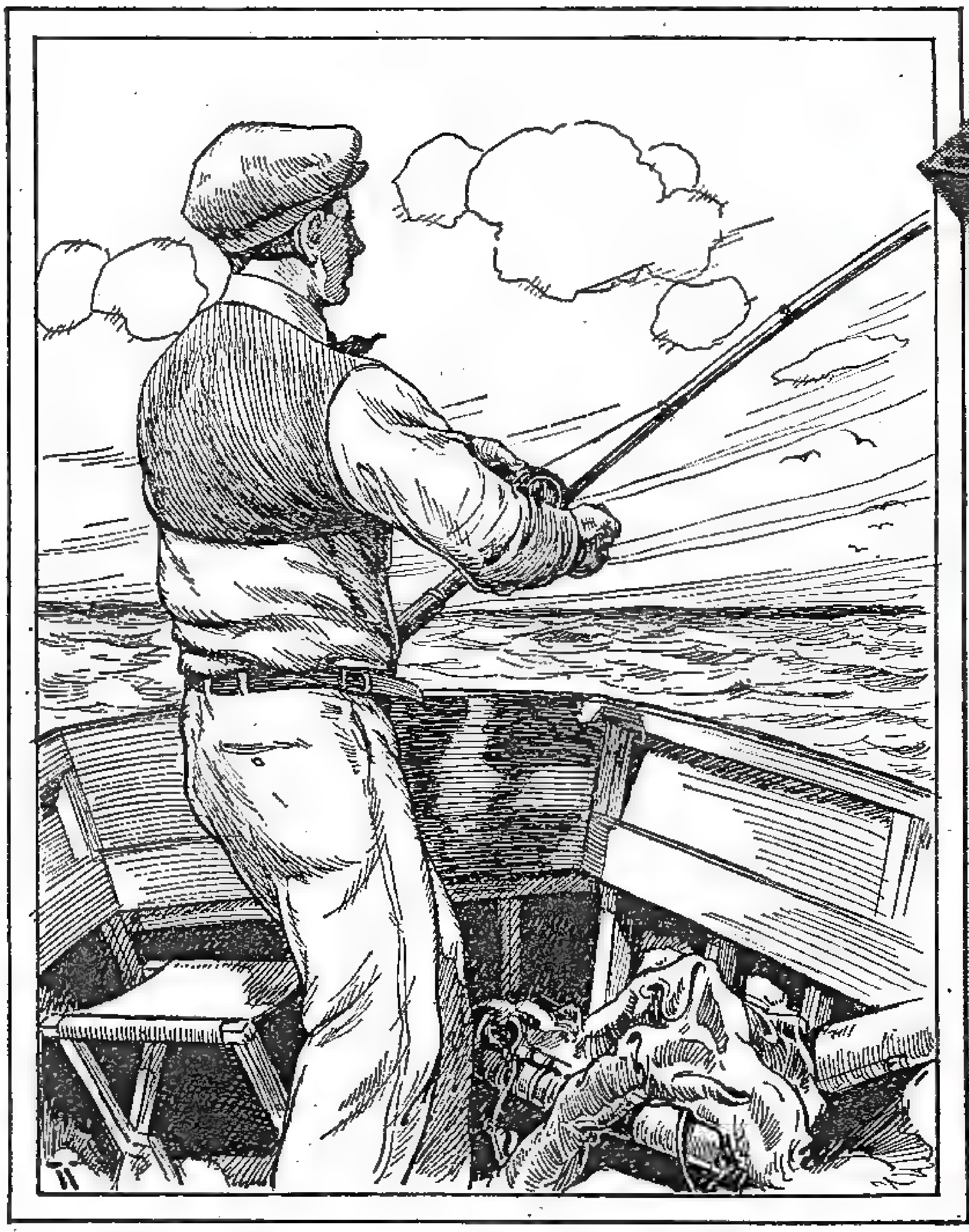
(Continued on page 127)



Try a Small Boat for Big Fish

For real fishing thrills wrestle swordfish and sea bass from an outboard motor boat.

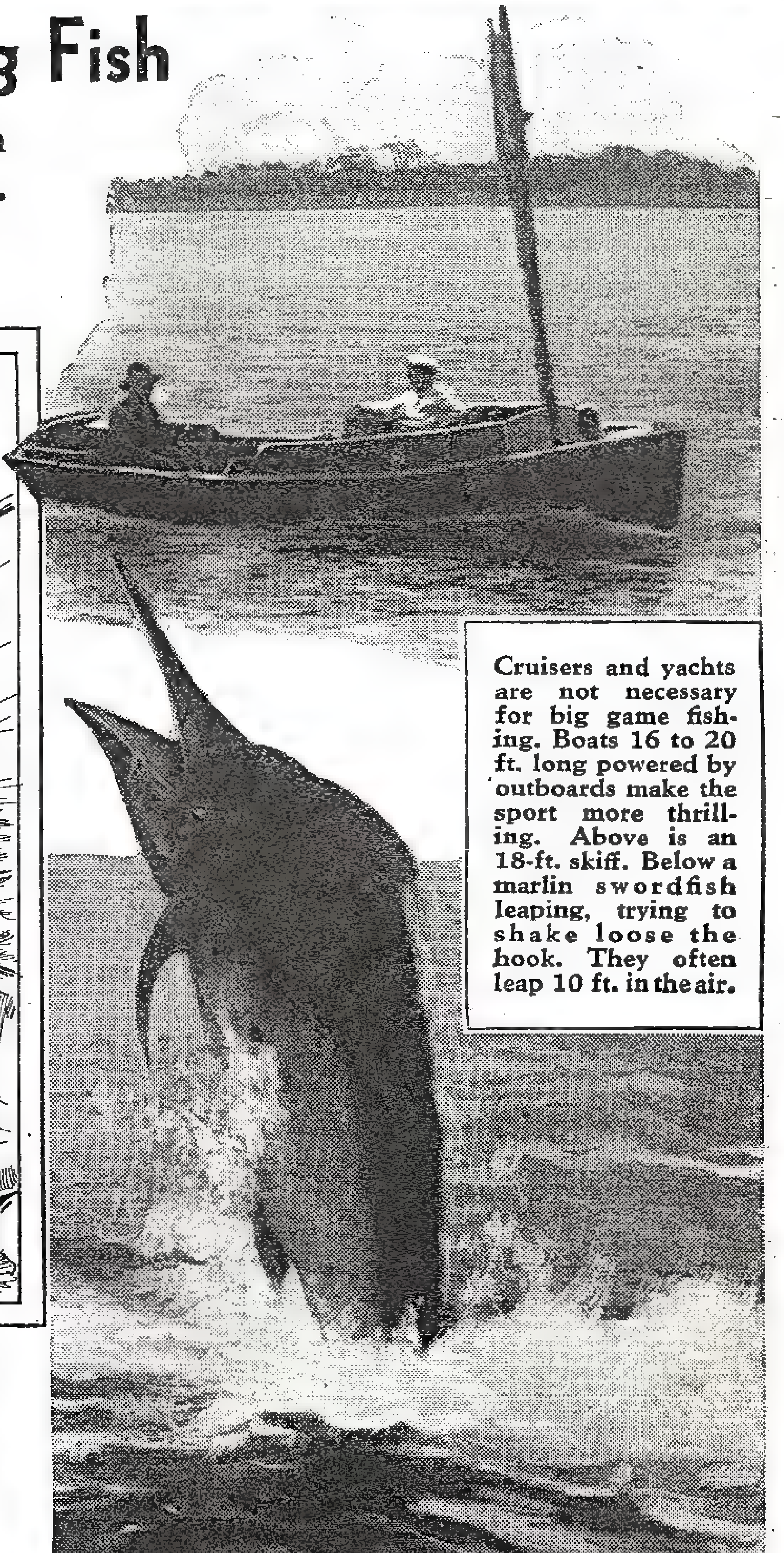
by PAUL W. GARTNER



When the sea giant strikes, a battle, often lasting hours, begins. Some anglers take 150-lb. fish on six-ounce rods.

A SICKLE-LIKE fin knifes through the bounding surface of the ocean. Experienced eyes identify a marlin swordfish, the prince of big game fishes. A small boat, powered by an outboard motor, cautiously circles the finned giant, as he lazily cruises about the sun-warmed surface. Two eager fishermen drop their baits to troll them across the path of the marlin. But will the sea titan strike?

Breathless moments, and the long shadow of purple and silver darts toward one of the skittering baits. He grabs the lure and whirls away, as the free spool of the angler's reel quickly and silently rips off line. Tensed and excited, the man can hardly resist the temptation to strike, but he knows he must wait until the game has swallowed the bait fish.



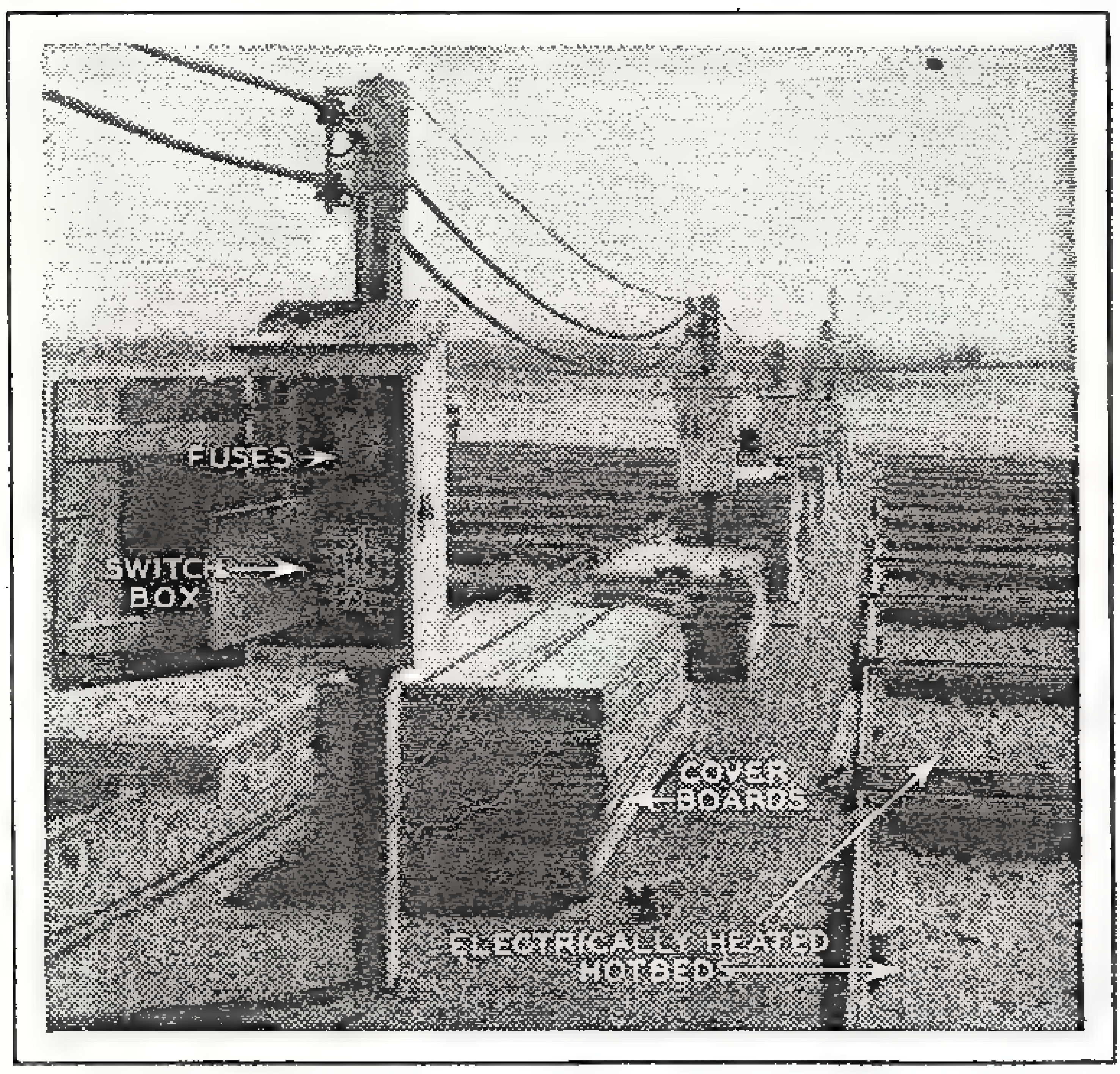
Cruisers and yachts are not necessary for big game fishing. Boats 16 to 20 ft. long powered by outboards make the sport more thrilling. Above is an 18-ft. skiff. Below a marlin swordfish leaping, trying to shake loose the hook. They often leap 10 ft. in the air.

Now the marlin pauses, but in a second opens up with a terrific run. The stout rod whips upward, and for an instant there is severe tension on rod and line. The battle has begun. A dozen times the marlin rises vibrantly above the rolling blue, while the angler realizes a thrill which many claim is unexcelled in any other field of sport.

Such is big game fishing as it is practiced from small craft in southern California waters. Swordfishing is no longer a sport to be

(Continued on page 127)

America's Largest Electric Hotbed Controls Plant Growth

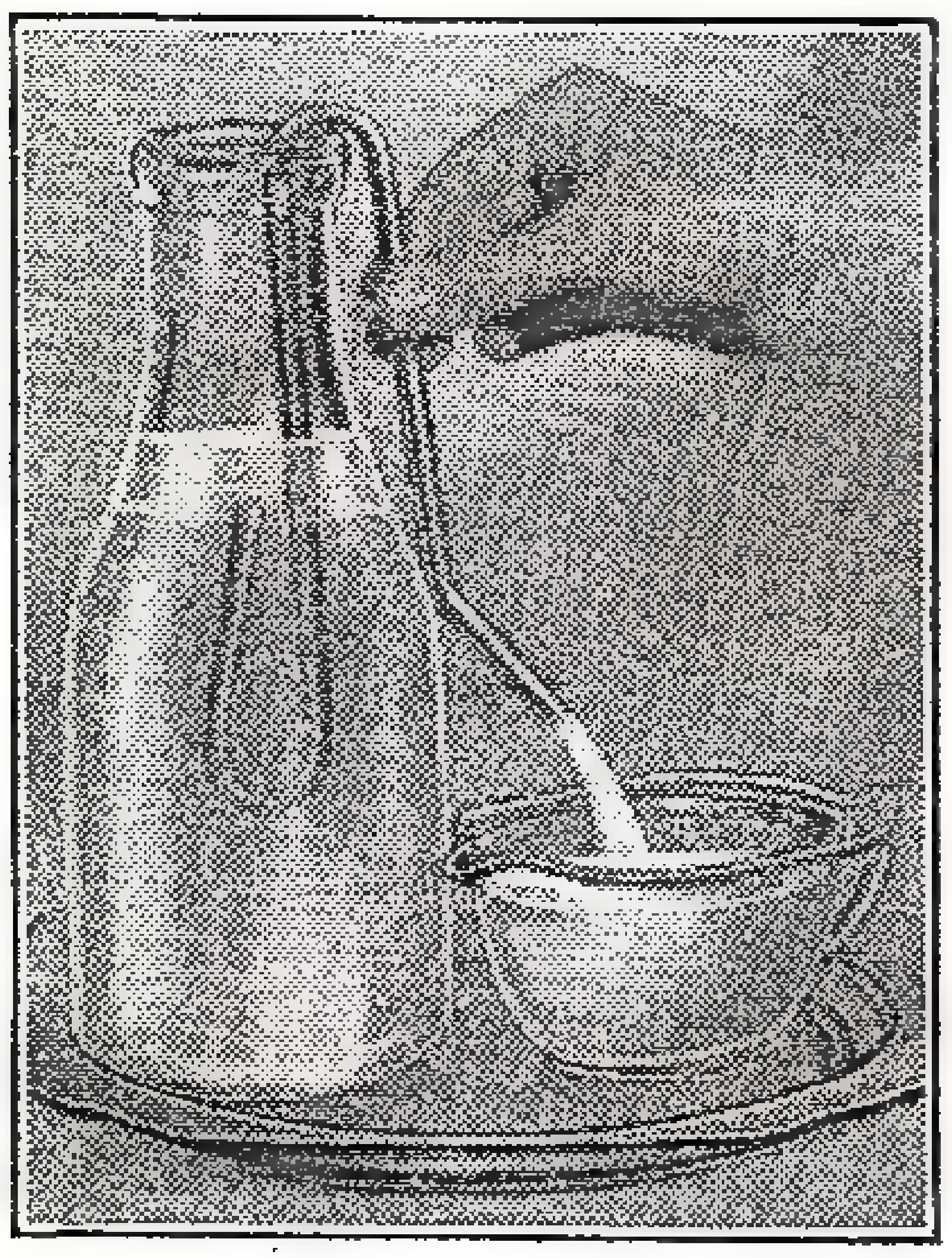


Second largest electric hotbed in world, at St. Louis, Mo., contains 30 beds each 6'x48' in size. In one year $25,000 worth of produce was obtained from plants started here.

A GIGANTIC electric hotbed, started in St. Louis by relief agencies, has grown into what is now the second largest unit of its kind in the world. Only one hotbed, and that in Soviet Russia, surpasses it in size.

One-inch thick lead cable is zig-zagged through the ground, six inches below the surface. Current travels through asbestos-covered nichrome resistance wire inside the lead sheath, providing heat for seedling plants of all kinds. A separate electrical control box is provided for each series of beds, since different plants require different temperatures.

Cream Siphon Is Self-Starting



Simple new cream-draining tube depends on trapped air for starting of siphon action.

RICH top cream pours out through a new self-starting milk bottle siphon a few seconds after the tube is lowered, and continues to flow until the average cream depth of pasteurized milk is reached. Air trapped by cream entering through two holes in the tube starts the siphon action.

Mechanical Pencil Holds Lighter

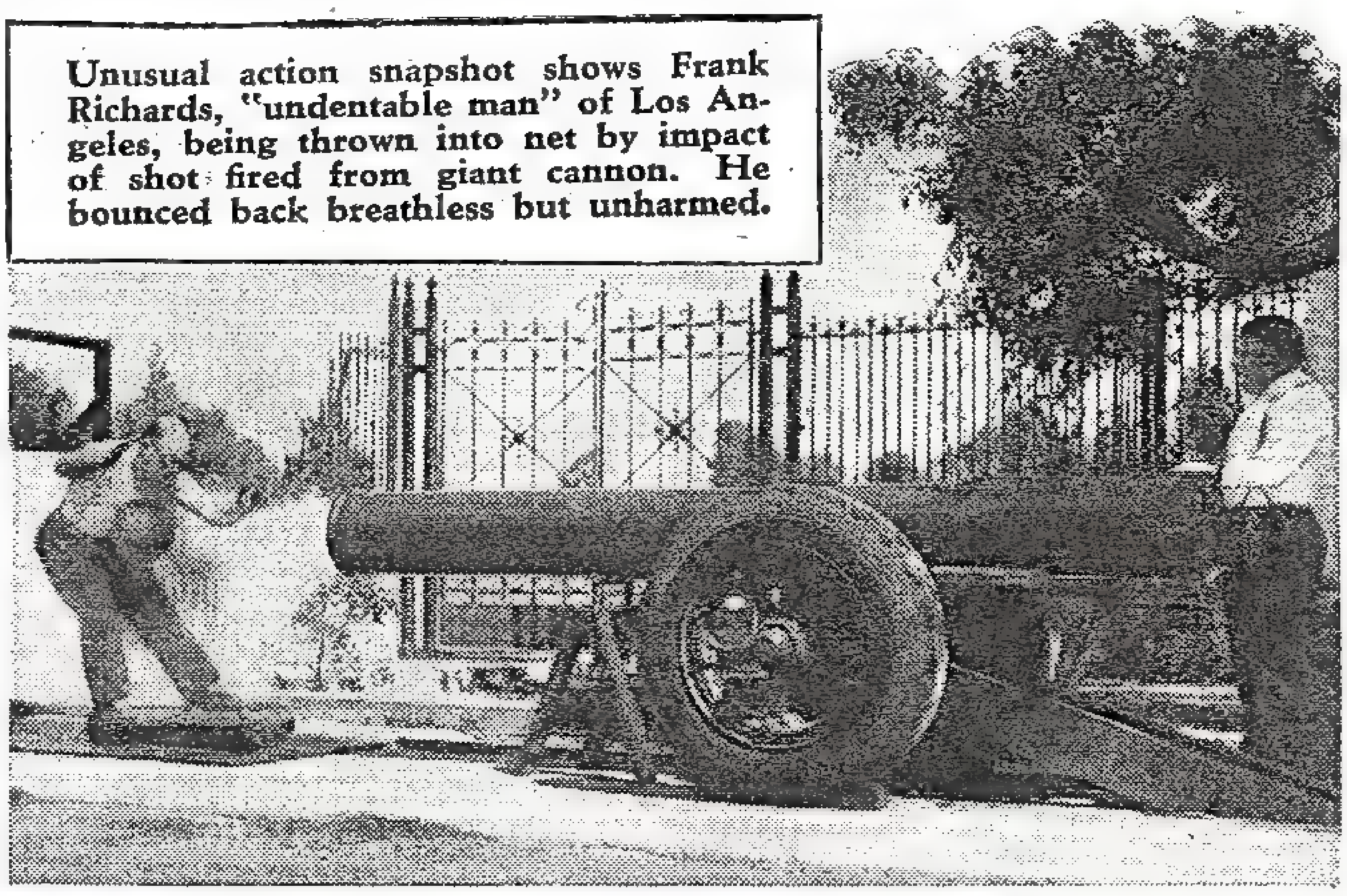
Flame of new cigarette lighter appears automatically as unit is withdrawn from end of novel mechanical pencil.

OFFICE smokers who reach for a light as often as a pencil will welcome a new mechanical pencil which holds a lighter in one end. Pulling out this end with a slight twist provides the light. The flame is put out by simply pushing the cylinder back into the pencil.

"Undentable Man" Stops Speeding Cannon Ball With His Stomach

AGAINST the durable torso of Frank A. Richards, Los Angeles stunt artist, a million fists, battering rams and sledge hammers have pounded to win him the title of the "undentable man."

Recently, while seeking new punches to conquer, he faced a loaded cannon. The gun roared —the shot flew from its mouth —and Richards, struck squarely in the solar plexus, bounced back into a net and out again, somewhat breathless but otherwise unscathed and triumphant.



Unusual action snapshot shows Frank Richards, "undentable man" of Los Angeles, being thrown into net by impact of shot fired from giant cannon. He bounced back breathless but unharmed.

Army Radio Simplifies Field Communication Problems

TELEPHONE squads and dispatch bearers may be eliminated from the army's system of field communication in the future with the perfection of a new portable radio set.

The equipment was recently displayed to visitors at the 1934 Radio Show in Madison Square Garden. The set is a compact unit, consisting of an ultra-high-frequency receiver and transmitter.

Operating on an extremely short wave length of approximately six meters, the range of the set is limited by the contours of the country since the straight-line waves cannot surmount natural obstacles of any great height. The set is entirely self-contained and operates on dry batteries.

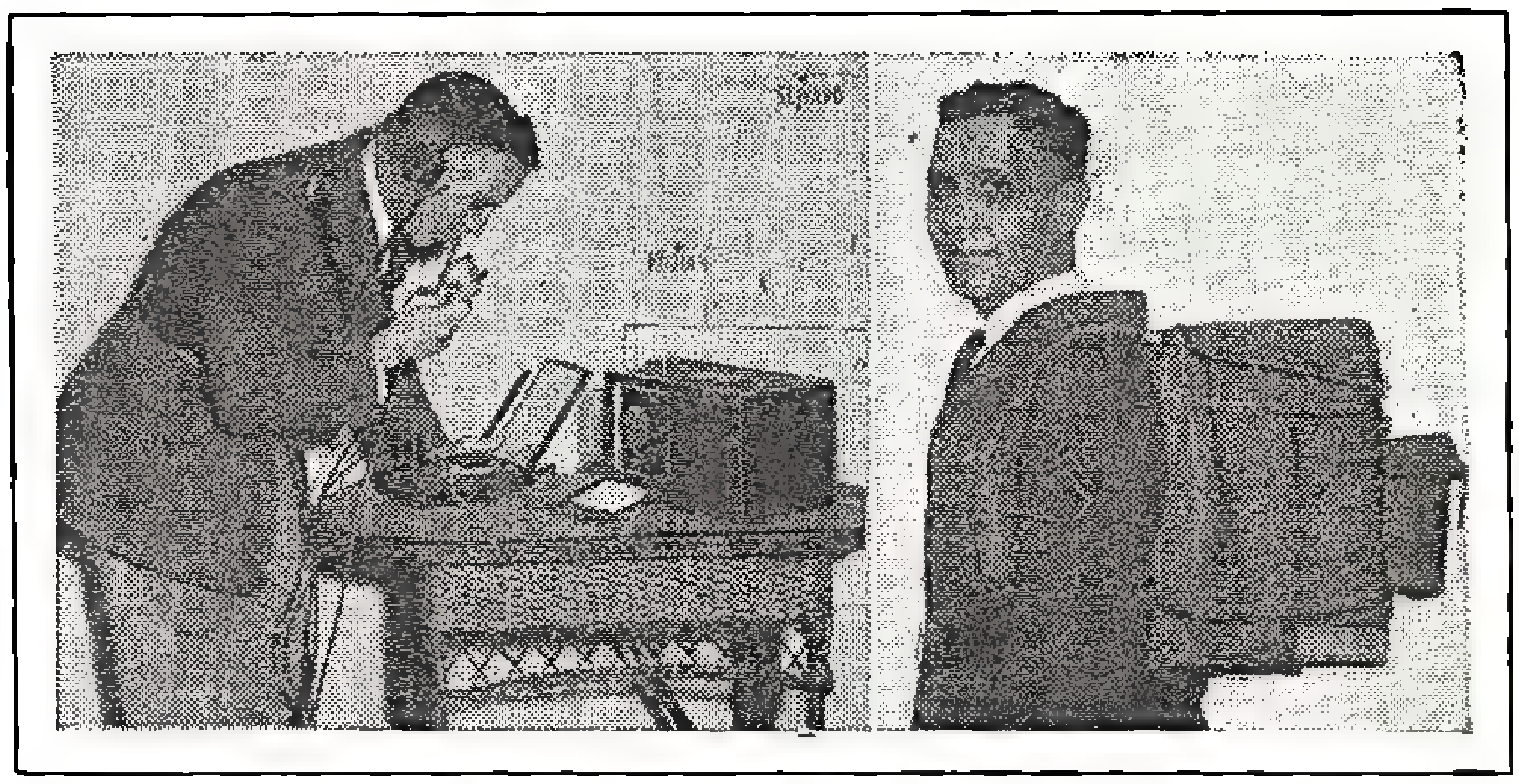


Photo at left shows the army's new short wave transmitter-receiver in action. At right, how the set is carried in the field. Note the compactness of the complete unit which weighs approximately 25 pounds.

Plane Collects Air Impurities

A closeup of the air-collecting device is shown attached to side of cockpit. Specimens are taken at various heights.

AS THE first step in a five-year program devoted to the study of air impurities and their effect upon the health of city inhabitants, the Philadelphia College of Pharmacy and Science is enlisting the aid of airplanes to collect samples of air. A collection tube through which the air passes is attached to the side of the plane. Samples of the atmospheric solid matter are taken at successive 250-foot levels up to an altitude of 2500 feet to determine presence of pollen and foreign elements.

Second Dog Is Restored to Life

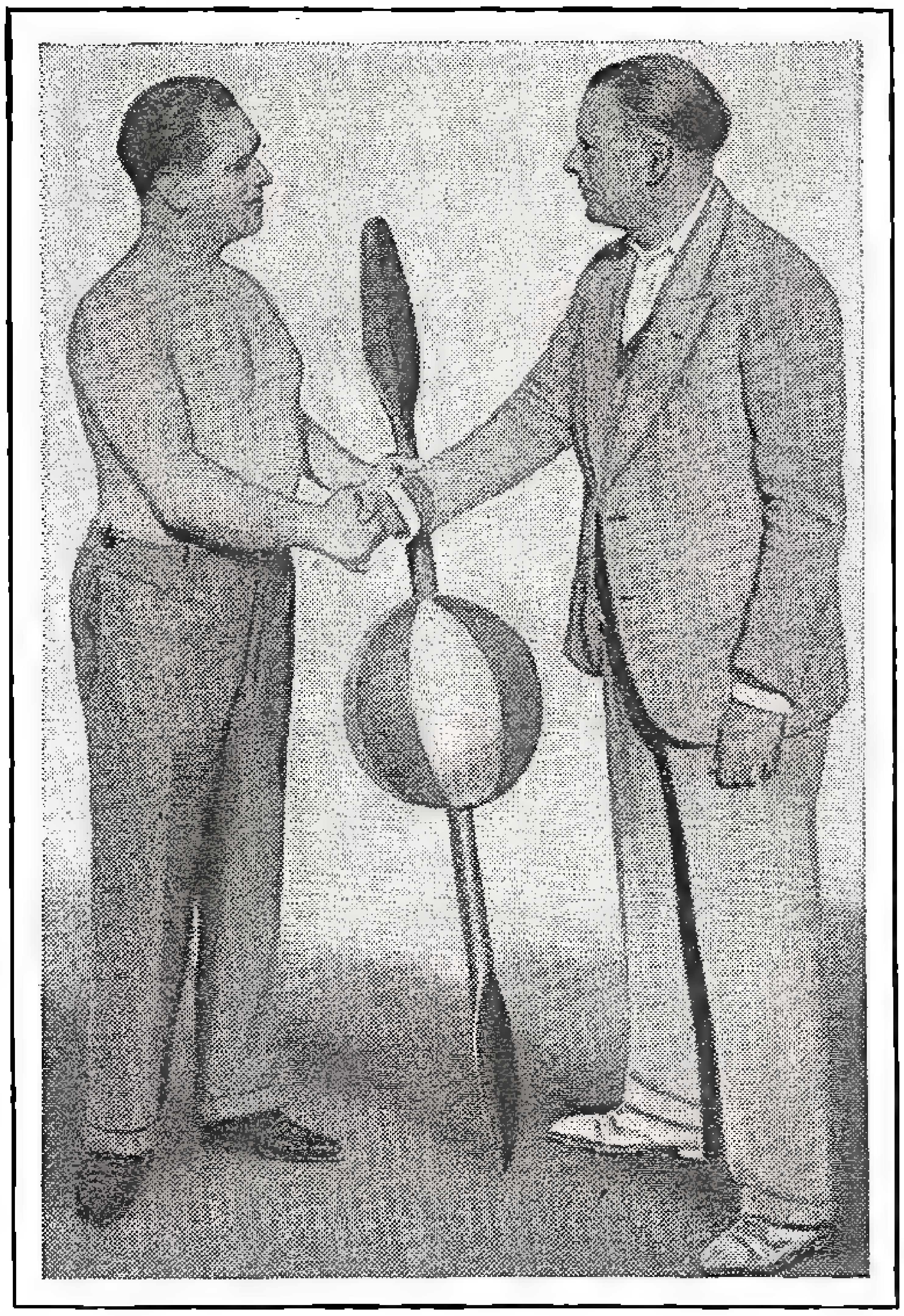
ROBERT E. CORNISH, California biologist, who amazed the scientific world last spring by reviving a dog clinically put to death (MODERN MECHANIX AND INVENTIONS, July, 1934) recently repeated the success of his original experiment with even more encouraging results.

Lazarus IV, subject of the first successful experiment, has learned to crawl, bark, sit up on its haunches and consume nearly a pound of meat a day. The dog is blind and cannot stand alone, but results encouraged Dr. Cornish to launch a new series of experiments.

Recently Lazarus V was put to death with an overdose of ether. Half an hour after its breathing had stopped and five minutes after its heart was stilled, the animal was revived by means of chemicals and artificial respiration. Dr. Cornish, enthusiastic, has been reported as saying that Lazarus V returned nearer normalcy in four days than the other Lazarus in thirteen days.

Dr. Robert E. Cornish, California biologist, is holding Lazarus IV and looking at Lazarus V. Both dogs were restored to life after they were clinically put to death.

Frenchman Crosses Channel With Odd Paddle Device



Charles Flourons, left, is congratulated for his successful crossing of the Channel. Note hydrosphere device.

PROPELLING himself through the water by means of a novel paddle device known as a hydrosphere, Charles Flourons, Paris, France, successfully crossed the English Channel from Cape Griz-Nez to Dover.

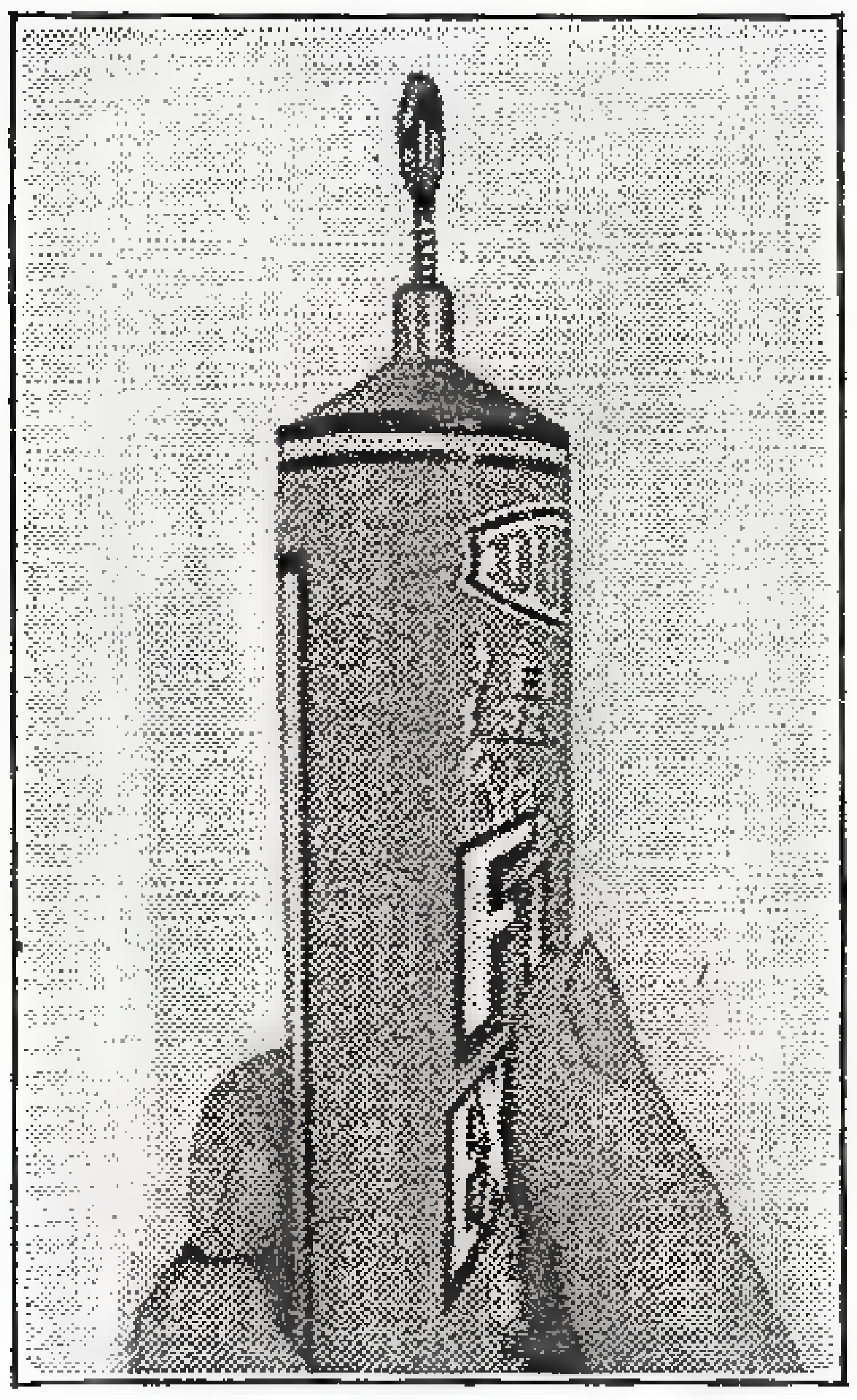
Flourons' hydrosphere consists of a ball one foot in diameter with a double-ended paddle, five feet long, passing through the center. The ball provides buoyancy and the paddles furnish necessary locomotion through the water.

Flourons operates the device by lying on his back in the water and turning the paddle with his hands. The trip was made in about 10½ hours. Flourons left Cape Griz-Nez at 10:30 p.m. and landed at Dover about 8:45 the following morning.

Fire Extinguisher Sold in Tubes

ONE of the newest protective devices for the home now on the market is a handy, quick-acting fire extinguisher which is retailed in tubes similar to those containing toothpaste. The device is not intended to substitute for the fire department, but is said to be effective as an emergency aid in quelling a small blaze.

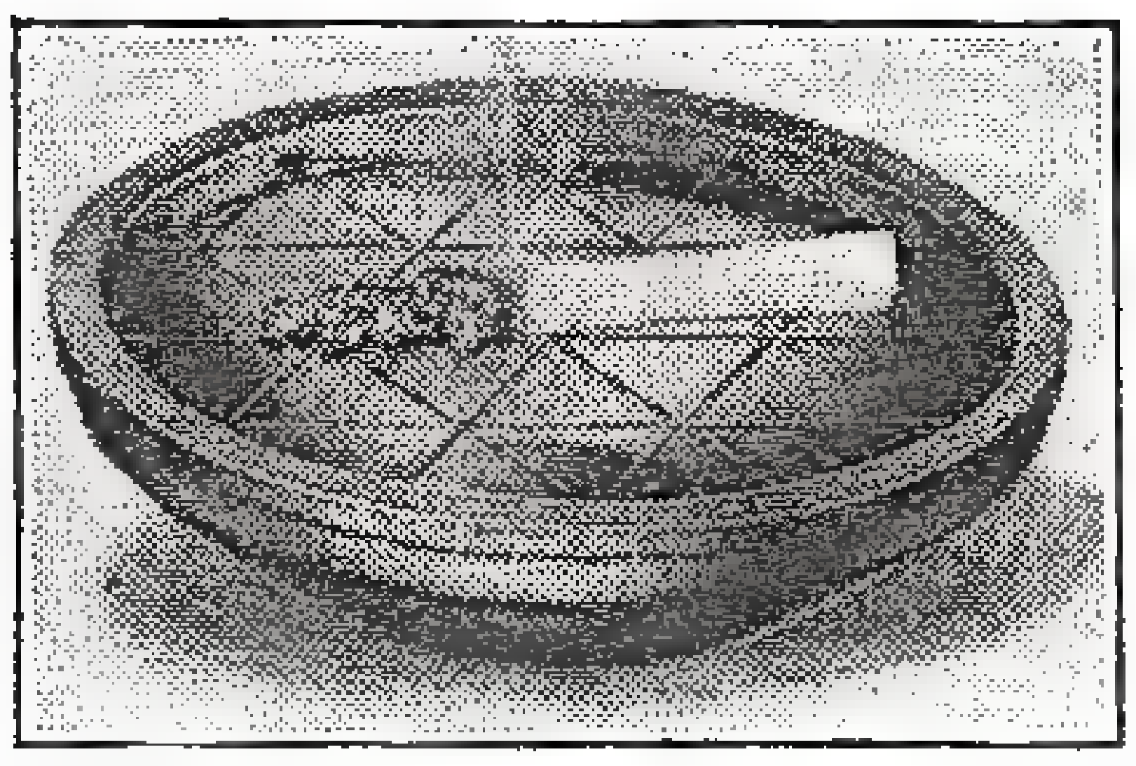
The tube extinguisher is simple in operation. A screweye in the cap is turned in as far as it will go and then removed. Held in the hand, tube is squeezed to release a chemical which creates a blanket of gas and smothers the flame. The device is said to be unusually effective as an emergency measure and retails at a surprisingly low sum.



After screweye is turned inward and removed, the tube is squeezed to release chemicals.

Cigaret Tray Has Wire Screen

BURNED table covers are said to be a thing of the past with a new wire-covered ash tray. Cigarets on screen cannot roll off onto table, but burn and drop through to tray.



Cigarets drop through screen instead of falling on the table.

Builds Playhouse From Oil Cans

BY SOLDERING together 1500 quart oil cans, Edgar Speer, Ohio mechanic, has constructed a novel playhouse for his small daughter.

By laying the soldered cans on their long axis and offsetting each course at the end, Speer has achieved a log cabin effect. Large enough to accommodate three or four full grown men, the cabin is 6½ feet long, 4½ feet wide and 6½ feet high. The project took about 2½ months of Speer's spare time. The work was done with a common blow torch and soldering iron.

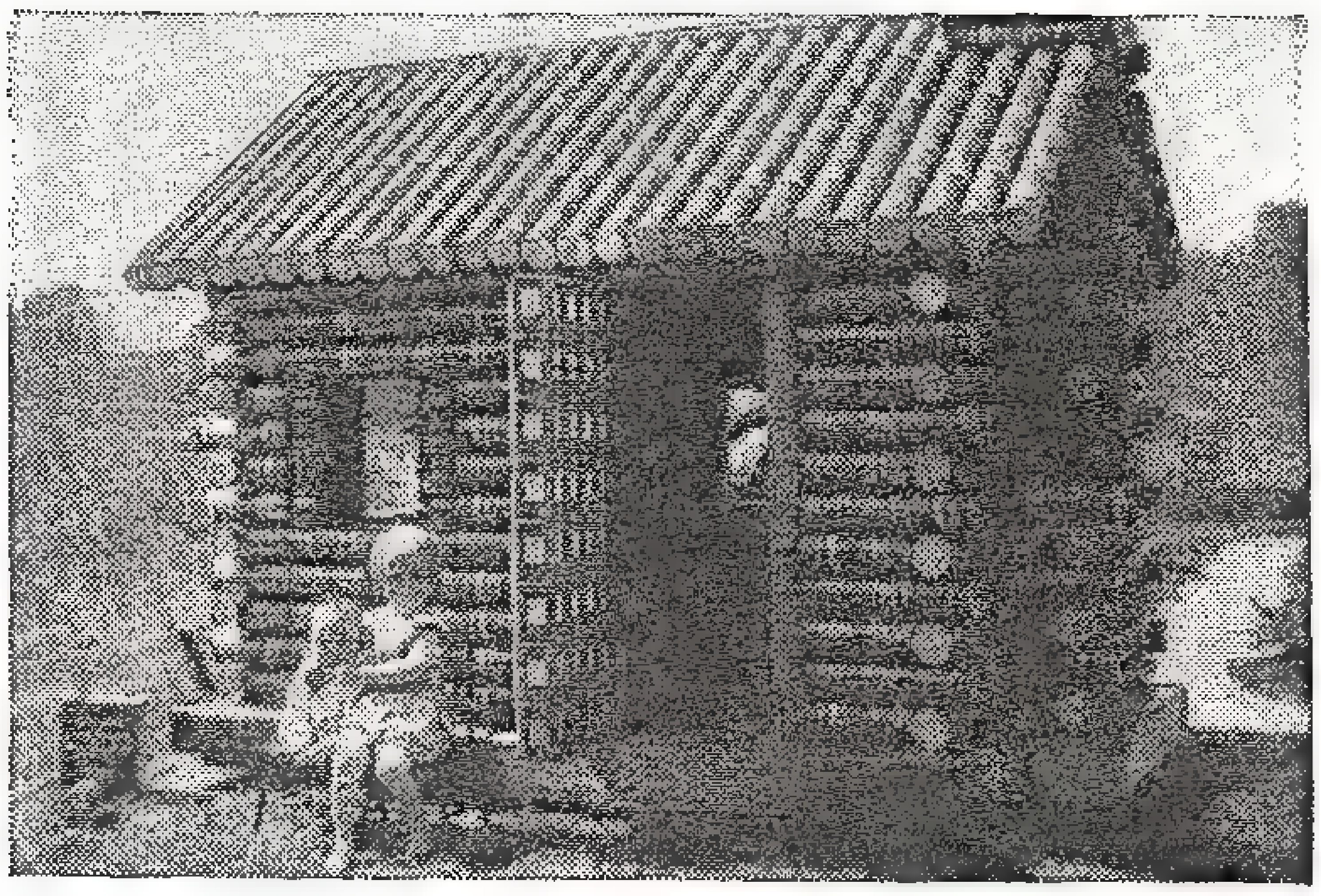
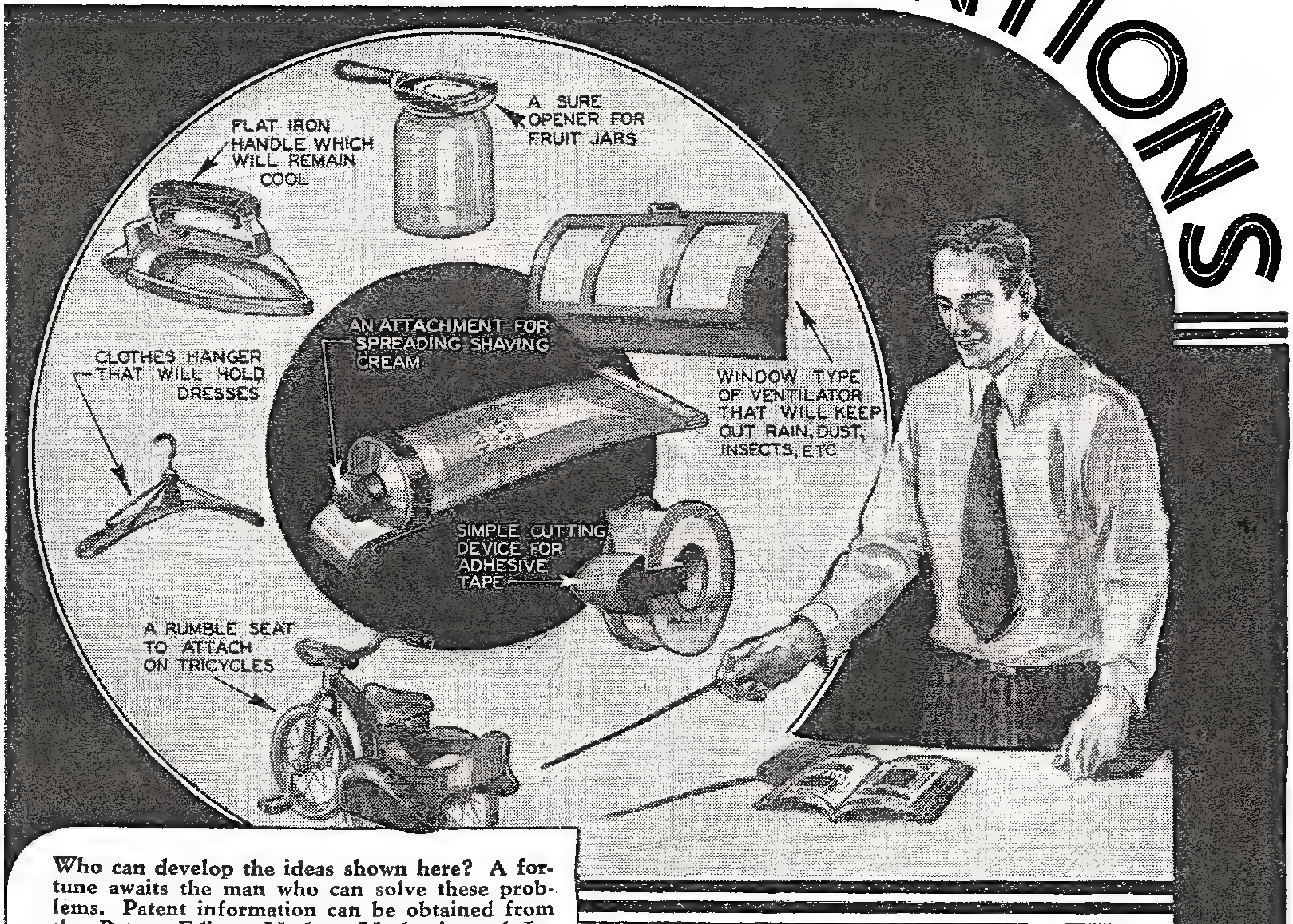


Photo shows the novel playhouse, constructed of 1500 qt. oil cans, made by an Ohio mechanic for his daughter.

NEEDED INVENTIONS


FLAT IRON HANDLE WHICH WILL REMAIN COOL
A SURE OPENER FOR FRUIT JARS
AN ATTACHMENT FOR SPREADING SHAVING CREAM
WINDOW TYPE OF VENTILATOR THAT WILL KEEP OUT RAIN, DUST, INSECTS, ETC.
CLOTHES HANGER THAT WILL HOLD DRESSES
SIMPLE CUTTING DEVICE FOR ADHESIVE TAPE
A RUMBLE SEAT TO ATTACH ON TRICYCLES

Who can develop the ideas shown here? A fortune awaits the man who can solve these problems. Patent information can be obtained from the Patent Editor, Modern Mechanix and Inventions, 529 S. Seventh St., Minneapolis, Minn.

WISE inventors everywhere are working overtime scheming and planning new articles that will catch the public fancy and manufacturers are busy scouting around for all sorts of new gadgets to put on the market. Both the inventors and manufacturers are preparing for another era of prosperity.

Those who have attempted to tear a piece of adhesive tape will appreciate the fact that the metal containers in which this material is sold are more or less incomplete. The inventor who can devise some sort of a cutting edge built in inexpensively to cut the tape without the use of scissors should be able to earn a good income.

Where is the inventor who can make an attachment that will change an ordinary chair into a baby high-chair? Such a chair would cost less than half the price of a high-chair and if it could be made of pressed metal, many thousands would be sold.

Mother, laboring in the kitchen, has had many improvements offered to her during the past few years, but she is still looking for a really reliable and sure fruit jar opener that will always work. It MUST be cheap and if it could be sold for a dime, a million could be disposed of within a short time.

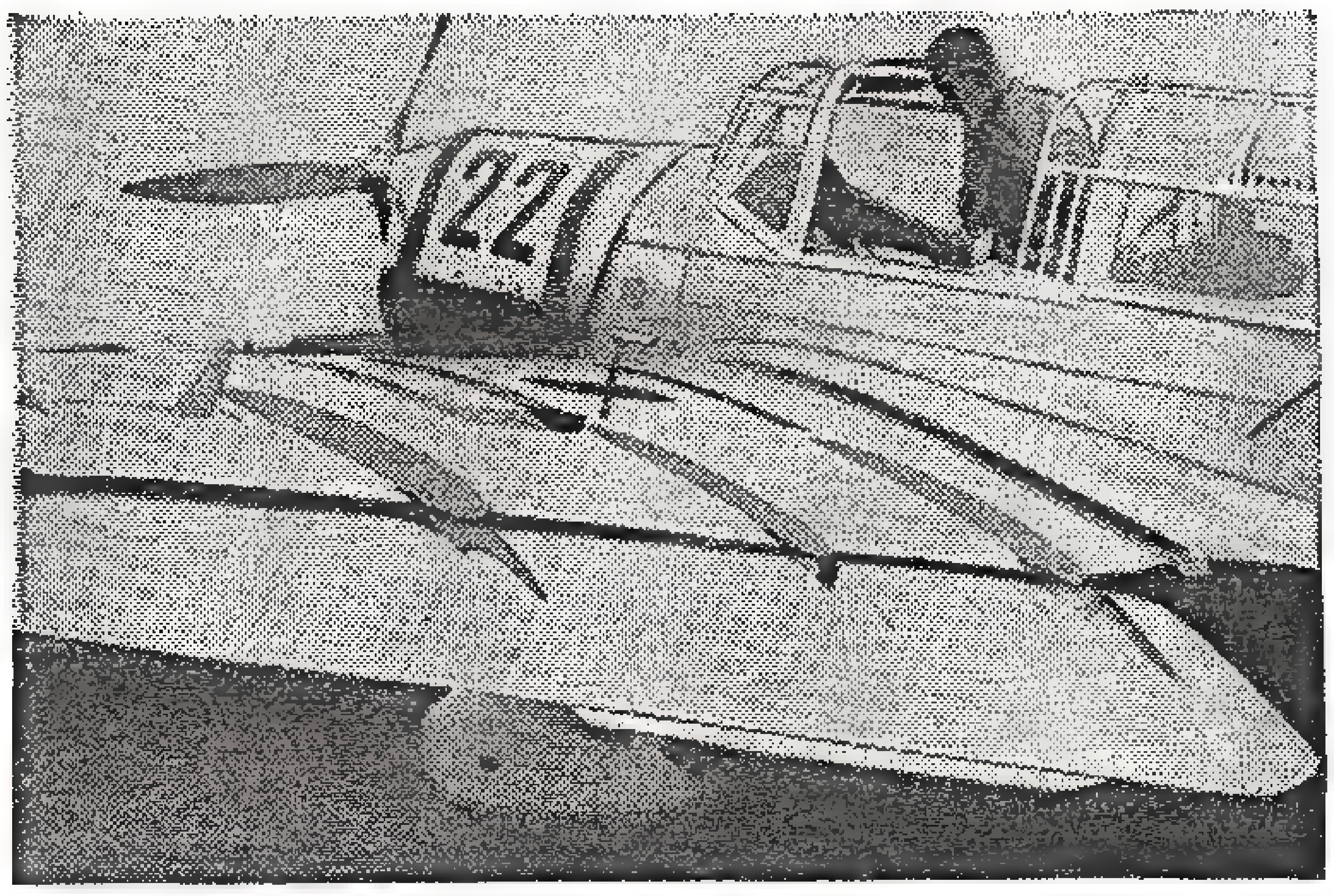
Ever since housekeeping emerged from the back woods, there has been a crying need for a flat iron handle that would remain comfortably cool and still the solution is not in sight. Such an invention should be worth a small fortune.

Problems, problems everywhere we turn if we are at all alert. Invention, after all, lies largely in the recognition of human need. Shaving creams of all sorts have been sold in collapsible tubes for a number of years but where is the simple attachment that will permit the shaver to spread a thin, even layer of this cream over the face directly from the tube? We still have to place it on the fingers and rub it on thereby wasting a large portion of it on the hands and fingers where it does not belong.

Kids who own tricycles could well use a simple little pressed metal seat that could be attached to the back like a rumble on

(Continued on page 142)

Germans Seek to Control Speeds With Sliding Wing Plane



Greater speed and maneuverability are possible in this German plane with the sliding wing section shown above.

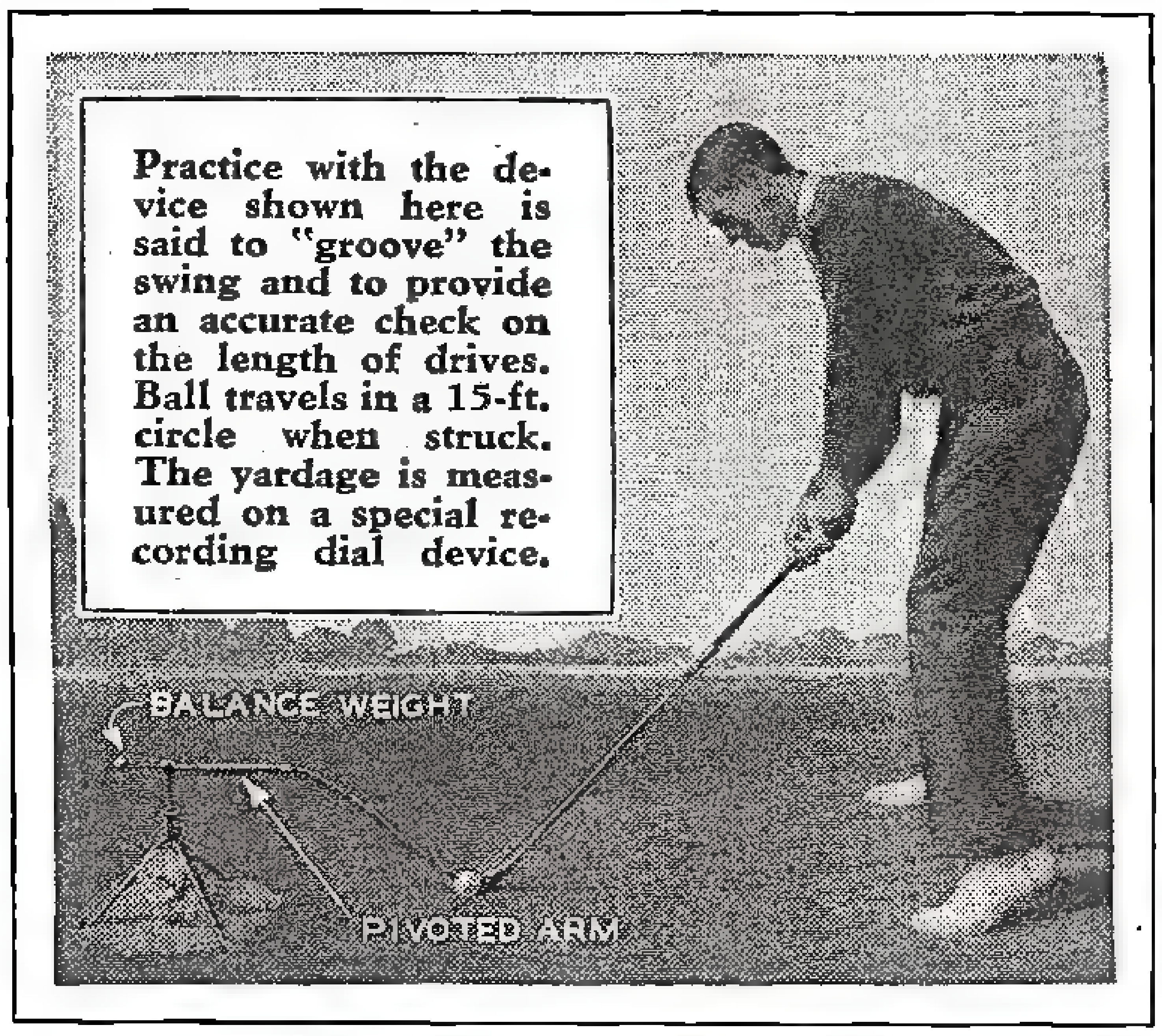
ONE of the highlights of a recent aviation meet at Warsaw was a German monoplane with a low-slung wing which literally shrinks in flight. The wing is in two sections, permitting the rear section to slide under the wing proper. By thus cutting down or increasing the wing area, flying speeds are raised and landing speeds lowered at pilot's will.

Near-Diamonds From Eyewash

NEAR-DIAMONDS, made from crystals of boric acid, or common eyewash, have recently been perfected by chemical experimenters. The crystals are black and unsuited for gems but are said to be the hardest material ever created by man. Their degree of hardness is less than that of diamonds but are said to surpass some of the commercial abrasives. The near-diamonds were made in a special furnace at about 5000 degrees Fahrenheit.

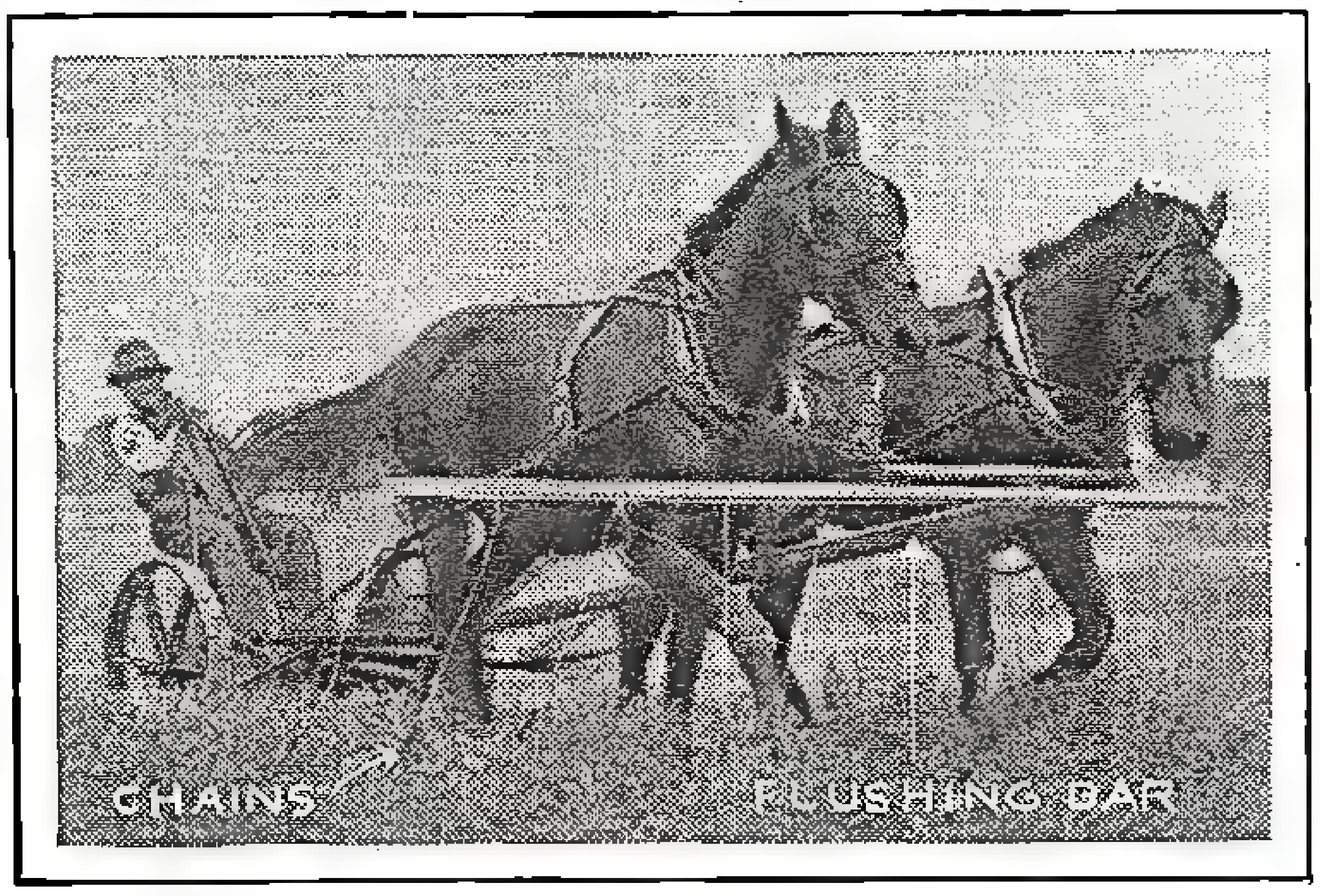
Drive Meter Aids Golf Practice

HAILED as a boon to golfers is a new device which permits home practice during both the summer and winter seasons. An ordinary golf ball is secured to a cable attached to a metal balance weight. When the ball is struck a spring takes up the shock of impact, allowing ball to travel smoothly around a 15 foot circle. Each revolution registers 5 yards on a dial. The device is anchored by a heavy metal plate whose weight prevents capsizing when the ball is struck. Provision is also made for clamping down the device if desired.



Practice with the device shown here is said to "groove" the swing and to provide an accurate check on the length of drives. Ball travels in a 15-ft. circle when struck. The yardage is measured on a special recording dial device.

Mower Guard Saves Nesting Birds



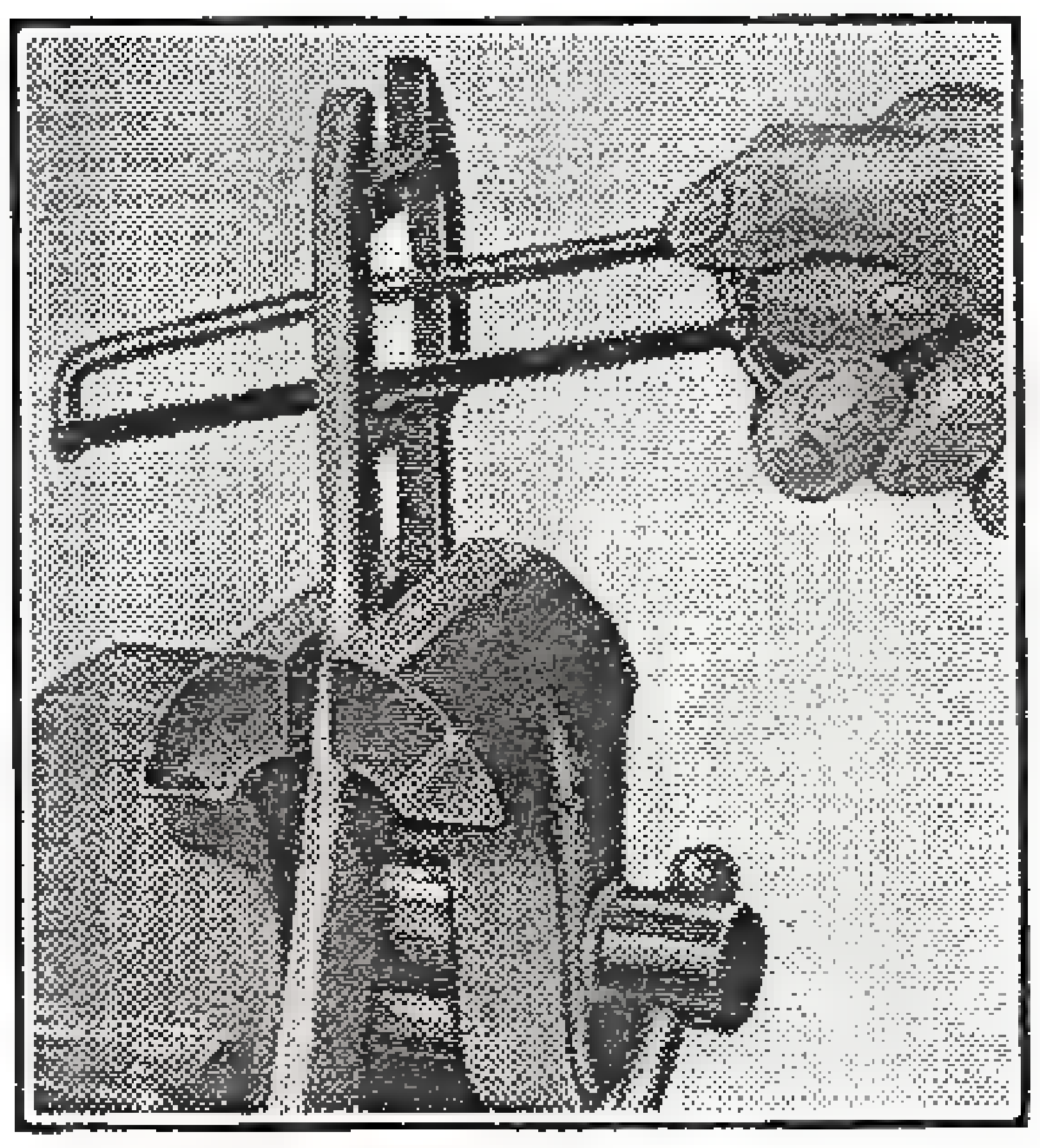
Chains dragging through field in front of mower flush field birds. Operator then raises sickles to save nests.

NESTING in the fields during haying and harvest time, thousands of birds are destroyed annually by the sharp-bladed knives of mowing machines and grain binders. With a simple device recommended by the Bureau of Biological Survey, a large part of this wholesale destruction is expected to be averted.

The equipment consists merely of a light strip of wood, known as a "flushing bar," which is attached to the tongue of the machine directly in front of the horses. From this bar a series of chains are suspended which drag through the hay or grain in advance of the mower's path. The noise made by the chains flushes the mother bird, enabling the operator to raise his sickle bar.

Hacksaw Operates in Small Space

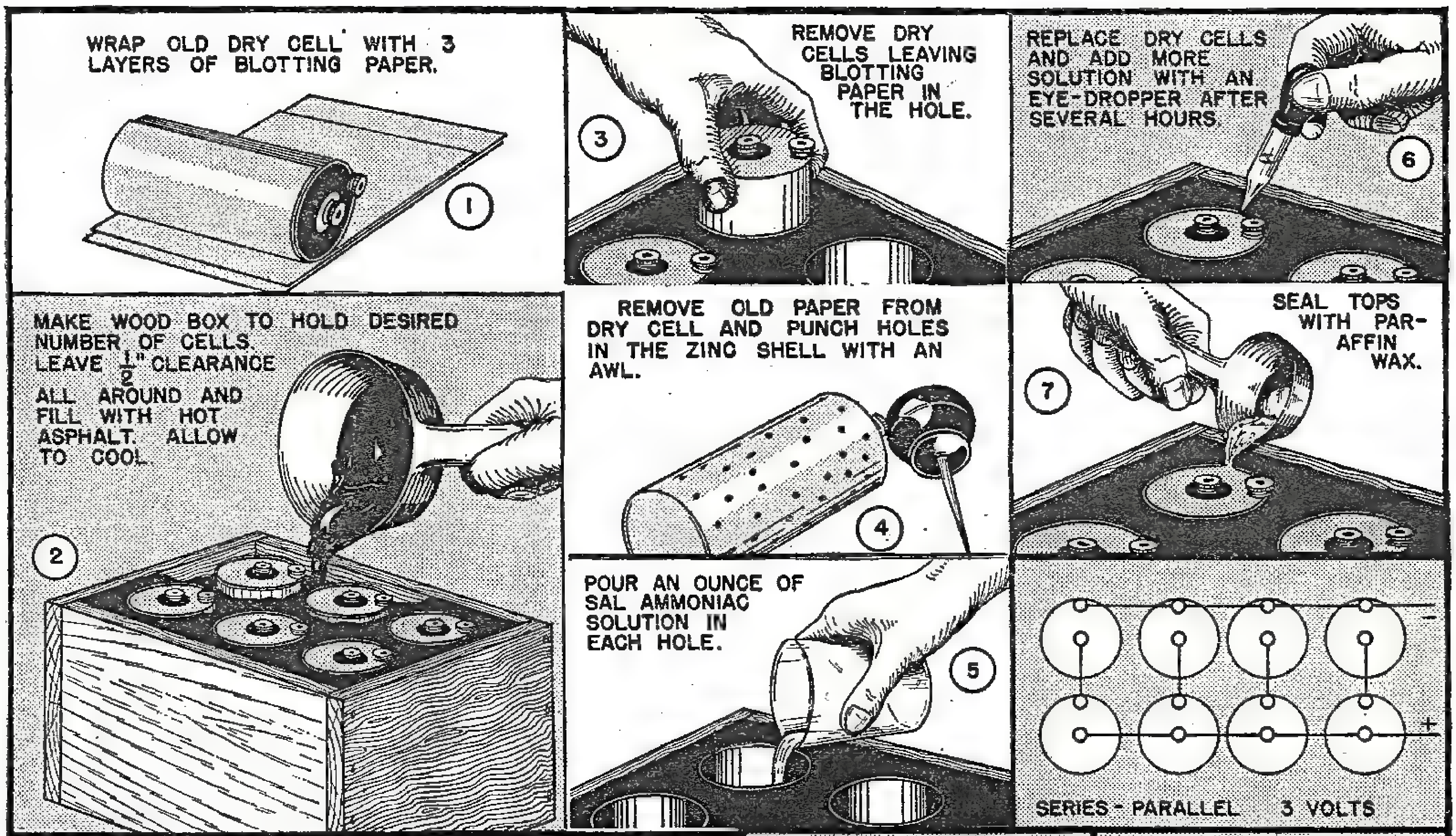
DESIGNED for restricted space, a hacksaw with a 6 inch blade has only a 1 inch space from cutting edge of blade to the back of frame. The saw is handy for autos, models and general work about the garage or the workshop.



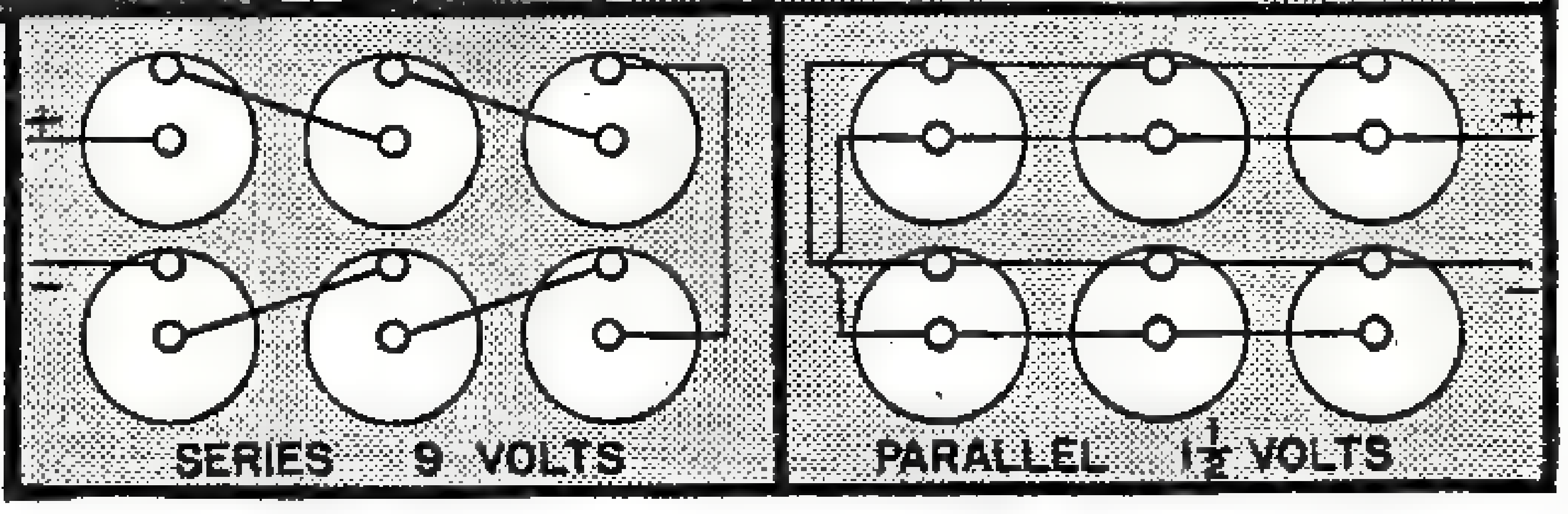
Note how the tiny hacksaw fits the restricted space with ease.

RADIO SPARKS

How to Obtain More Service From Discarded Dry Cells


WRAP OLD DRY CELL WITH 3 LAYERS OF BLOTTING PAPER.
1
MAKE WOOD BOX TO HOLD DESIRED NUMBER OF CELLS. LEAVE ½" CLEARANCE ALL AROUND AND FILL WITH HOT ASPHALT. ALLOW TO COOL.
2
REMOVE DRY CELLS LEAVING BLOTTING PAPER IN THE HOLE.
3
REMOVE OLD PAPER FROM DRY CELL AND PUNCH HOLES IN THE ZINC SHELL WITH AN AWL.
4
POUR AN OUNCE OF SAL AMMONIAC SOLUTION IN EACH HOLE.
5
REPLACE DRY CELLS AND ADD MORE SOLUTION WITH AN EYE-DROPPER AFTER SEVERAL HOURS.
6
SEAL TOPS WITH PARAFFIN WAX.
7
-
+
SERIES - PARALLEL 3 VOLTS

Above sketches indicate procedure to be followed in bringing discarded dry cells back to life. Four ounces of sal ammoniac can be obtained at drug stores for about 15c.


+
-
SERIES 9 VOLTS
+
-
PARALLEL 1½ VOLTS

Series-parallel connections are used for tube filament power; series for B or C batteries; parallel for high current.

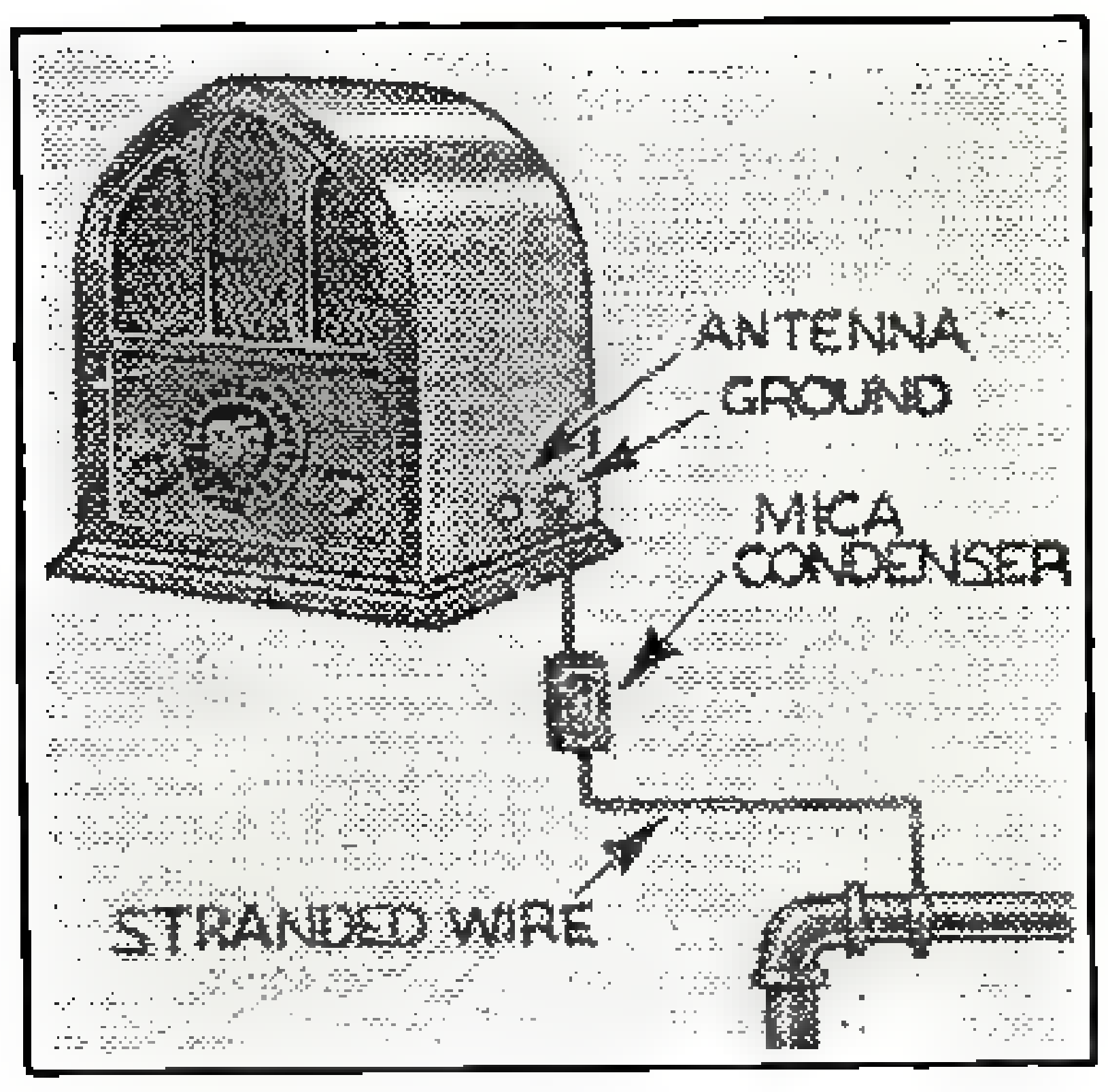
EVEN though a dry cell is completely dead, the rejuvenating procedure covered in the above sketches will make it deliver rated voltage just as long as there is any zinc left in the case. Four of the cells hooked in series make a good hot shot battery for ignition purposes.

The size of box to be used will of course depend upon the voltage desired, each cell being rated at 1½ volts. The asphalt used between cells can be obtained in chunks from any paving contractor, and melted in an old kettle. A thin layer of asphalt should be poured over the bottom of the box before setting in the cells.

Add four ounces of sal ammoniac to a quart of water to obtain a saturated solution, and pour a few ounces into each cell pocket. Several hours after replacing the cells add more solution to bring the liquid level nearly to the tops of the cells.

Operating Radio Without Aerial

EXCELLENT reception is obtained on many radio sets without using an aerial, if the antenna and ground binding posts of the set are connected together with a short wire. A mica condenser is placed in series with the ground lead.


ANTENNA
GROUND
MICA CONDENSER
STRANDED WIRE

Connect radio as shown to bring in programs without aerial. Use any size condenser in ground lead as shown above.

Two Tube All-Wave Radio

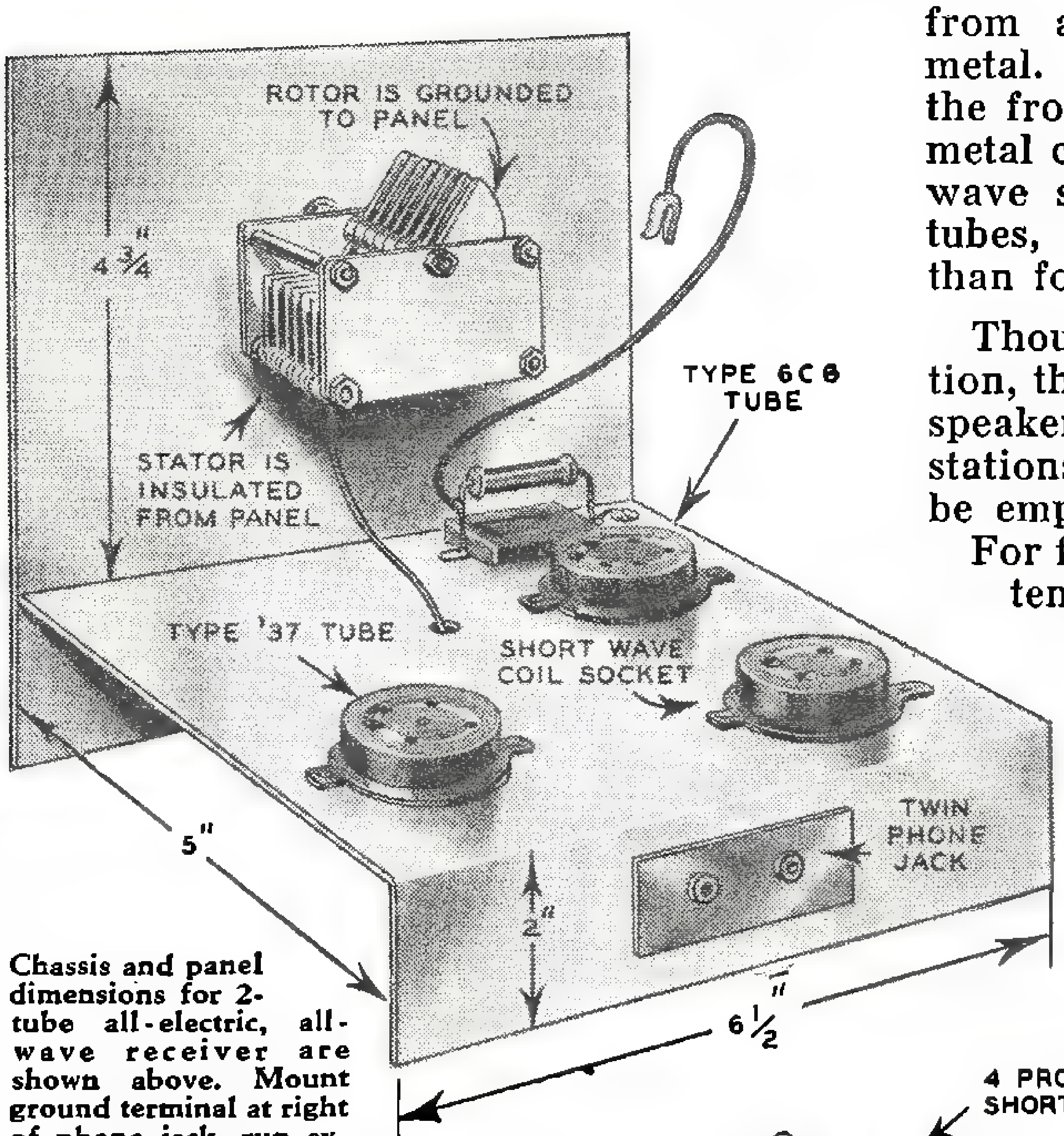
By using the new triple-function 6C6 tube, foreign reception with headphones, local programs on the loudspeaker are obtained with this compact two-tube all-electric long and short wave receiver.

IN ADDITION to bringing in broadcast entertainment, this compact two tube all-electric receiver provides the thrills of foreign short wave reception. It will work anywhere where 100 to 120 volt power, either alternating or direct current, is available.

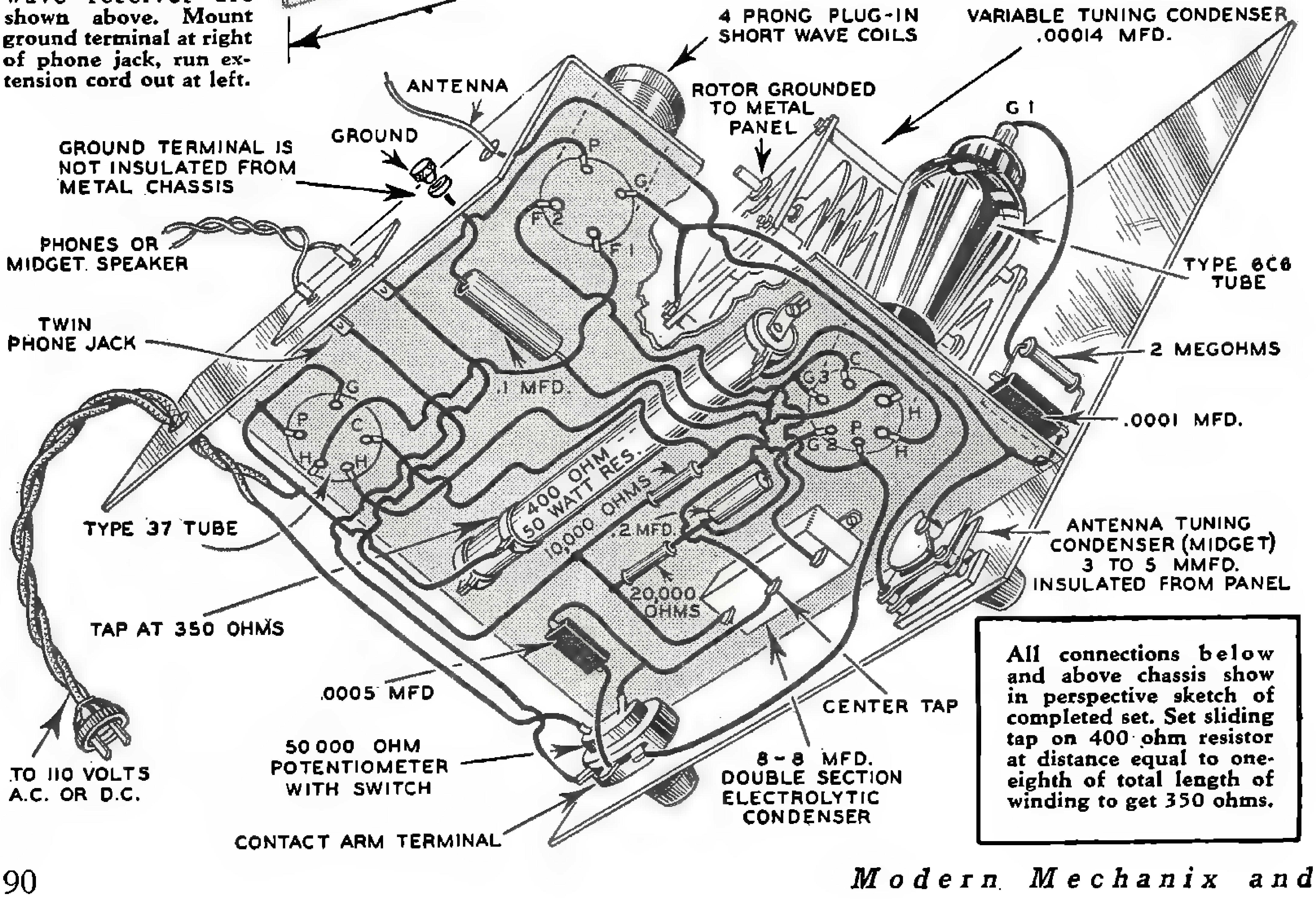
The set is built up on a metal chassis cut from aluminum or any available sheet metal. The metal front panel also serves as the front of the ornamental crackle finish metal cabinet used so extensively by short wave set builders. The entire set, with tubes, coils, and headphones, weighs less than four pounds.

Though designed for headphone operation, this set will operate a small magnetic speaker very nicely on the powerful local stations. Two or more sets of phones may be employed at the same time if desired. For foreign reception a good outdoor antenna with one of the commercial noise-eliminating lead-in systems is recommended, but for local broadcasts even a short indoor aerial will prove satisfactory.

The circuit is beautifully simple. Only two tubes are used, one of these, the type '37, with plate and grid tied together, serving only as a rectifier.


ROTOR IS GROUNDED TO PANEL
4 3/4"
TYPE 6C6 TUBE
STATOR IS INSULATED FROM PANEL
TYPE '37 TUBE
SHORT WAVE COIL SOCKET
TWIN PHONE JACK
5"
2"
6 1/2"

Chassis and panel dimensions for 2-tube all-electric, all-wave receiver are shown above. Mount ground terminal at right of phone jack, run extension cord out at left.


4 PRONG PLUG-IN SHORT WAVE COILS
VARIABLE TUNING CONDENSER .00014 MFD.
ANTENNA
ROTOR GROUNDED TO METAL PANEL
G 1
GROUND
GROUND TERMINAL IS NOT INSULATED FROM METAL CHASSIS
P
G
F2
F1
PHONES OR MIDGET SPEAKER
TYPE 6C6 TUBE
TWIN PHONE JACK
2 MEGOHMS
.1 MFD.
G3
C
H
P
G2
H
.0001 MFD.
G
P
C
H
H
400 OHM 50 WATT RES.
10,000 OHMS
2 MFD.
20,000 OHMS
TYPE 37 TUBE
ANTENNA TUNING CONDENSER (MIDGET) 3 TO 5 MMFD. INSULATED FROM PANEL
TAP AT 350 OHMS
.0005 MFD
CENTER TAP
50 000 OHM POTENTIOMETER WITH SWITCH
8-8 MFD. DOUBLE SECTION ELECTROLYTIC CONDENSER
TO 110 VOLTS A.C. OR D.C.
CONTACT ARM TERMINAL

All connections below and above chassis show in perspective sketch of completed set. Set sliding tap on 400 ohm resistor at distance equal to one-eighth of total length of winding to get 350 ohms.

Plugs Into LIGHT SOCKET

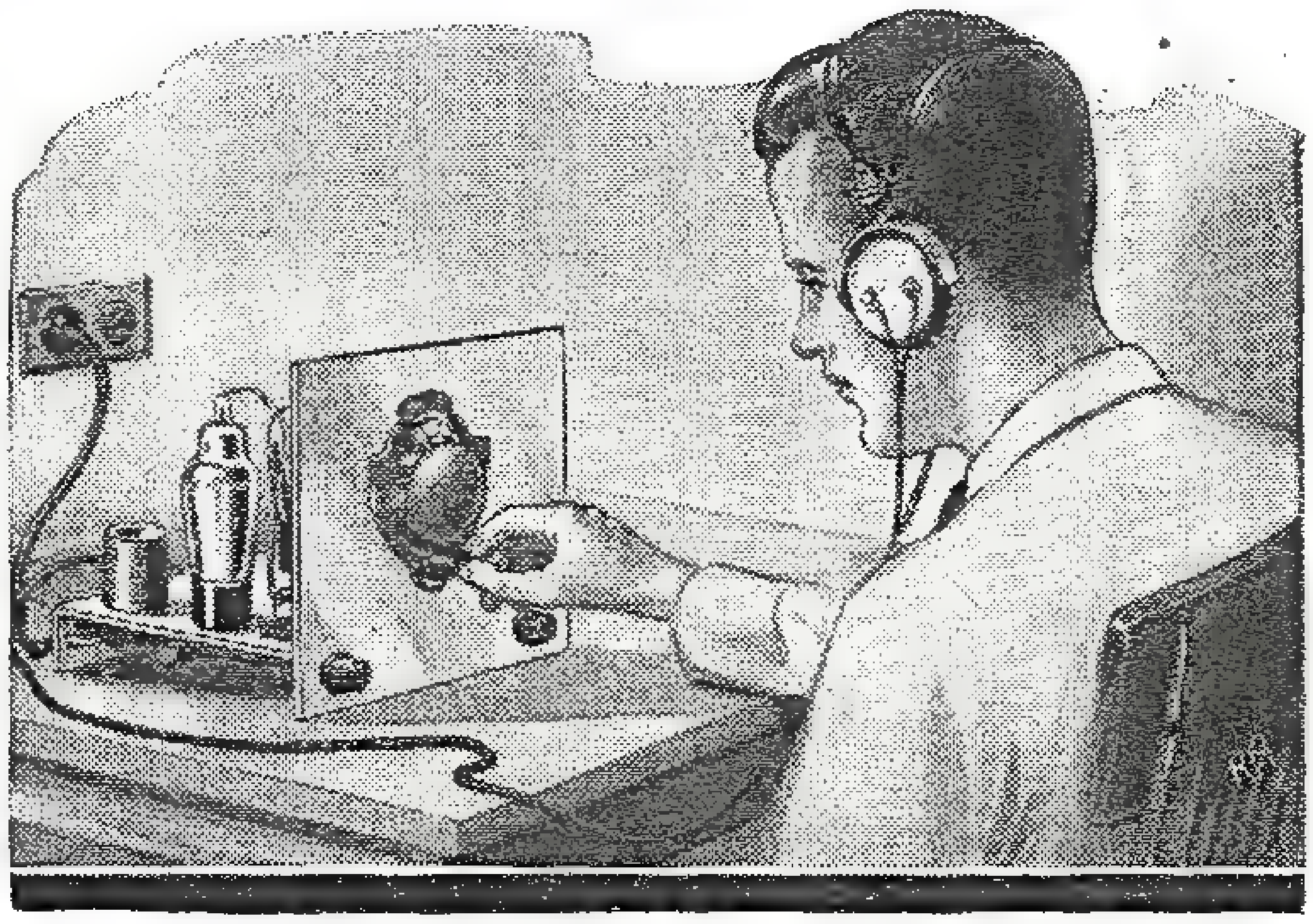
The new 6C6 tube used in this set actually does the work of three ordinary radio tubes, picking up the radio frequency signals, detecting them, then furnishing the audio frequencies for the headphone.

Naturally, regeneration is used to make the set as sensitive and selective as possible. A potentiometer shunted across the tickler winding of the plug-in coil serves as regeneration control.

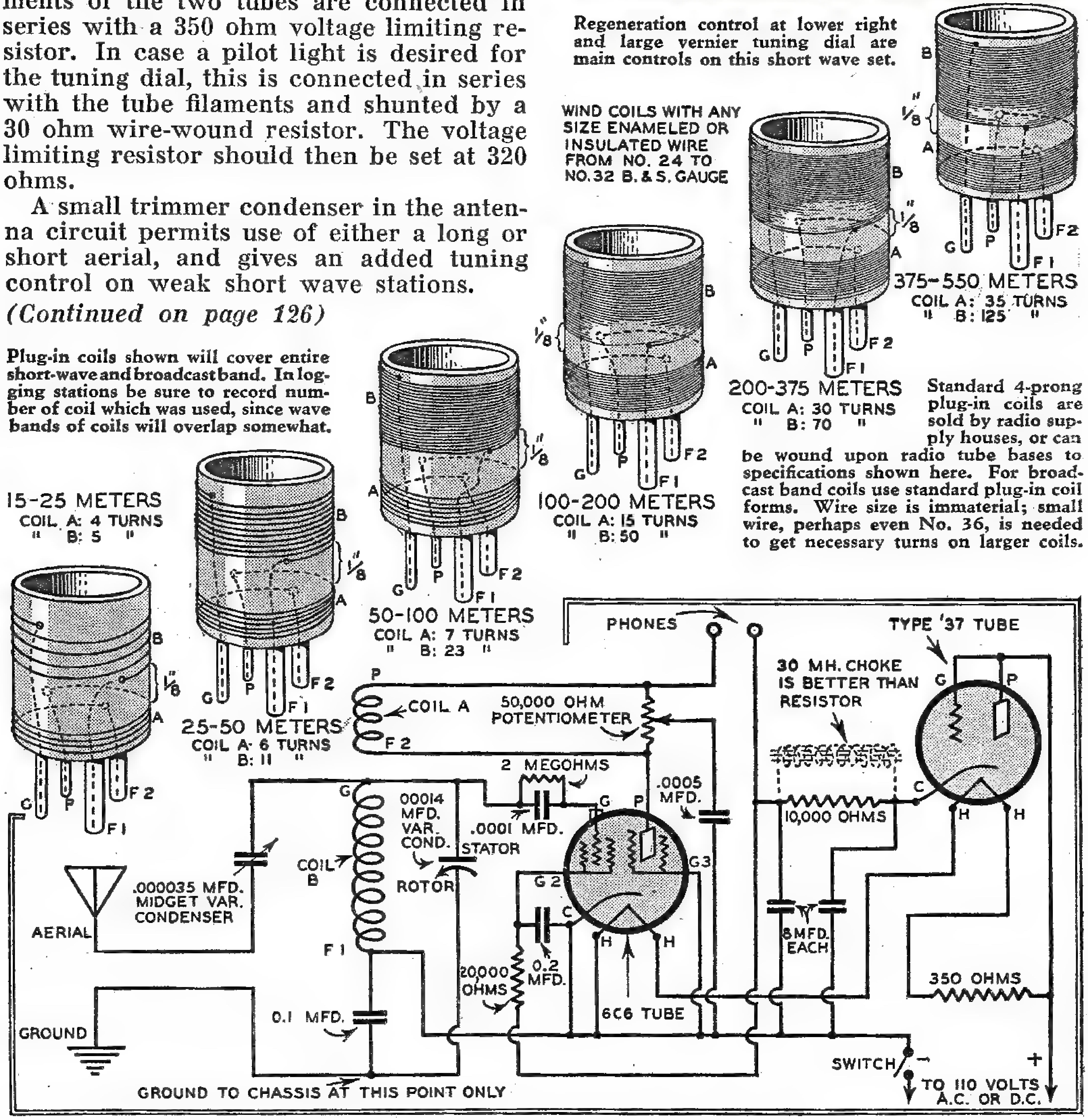
The Cisin Universal A.C.—D.C. circuit permits this set to be used interchangeably on alternating or direct current. The filaments of the two tubes are connected in series with a 350 ohm voltage limiting resistor. In case a pilot light is desired for the tuning dial, this is connected in series with the tube filaments and shunted by a 30 ohm wire-wound resistor. The voltage limiting resistor should then be set at 320 ohms.

A small trimmer condenser in the antenna circuit permits use of either a long or short aerial, and gives an added tuning control on weak short wave stations.

(Continued on page 126)



Regeneration control at lower right and large vernier tuning dial are main controls on this short wave set.

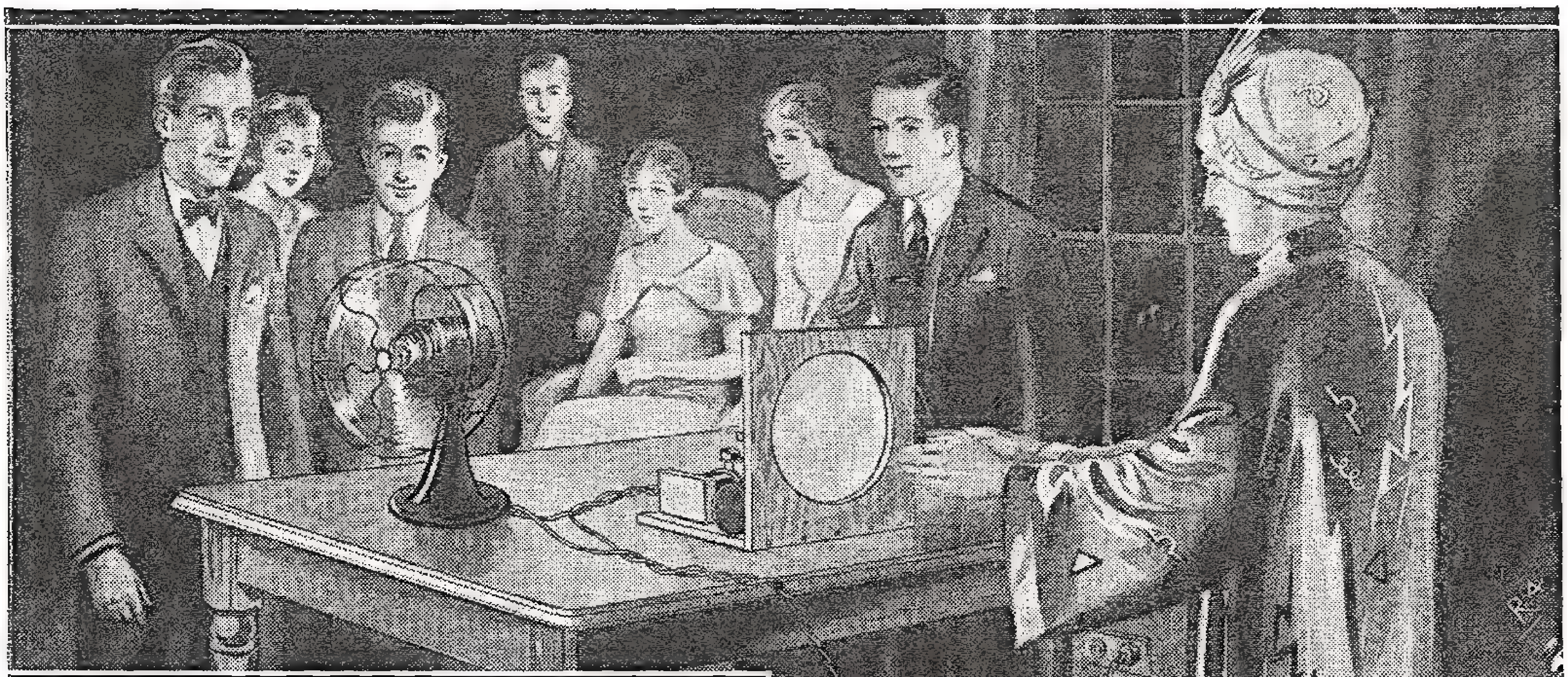

WIND COILS WITH ANY SIZE ENAMELED OR INSULATED WIRE FROM NO. 24 TO NO.32 B.&S. GAUGE
375-550 METERS
COIL A: 35 TURNS
" B: 125 "
200-375 METERS
COIL A: 30 TURNS
" B: 70 "
100-200 METERS
COIL A: 15 TURNS
" B: 50 "
50-100 METERS
COIL A: 7 TURNS
" B: 23 "
25-50 METERS
COIL A: 6 TURNS
" B: 11 "
15-25 METERS
COIL A: 4 TURNS
" B: 5 "
B
A
1/8"
G
P
F1
F2
PHONES
TYPE '37 TUBE
30 MH. CHOKE IS BETTER THAN RESISTOR
COIL A
50,000 OHM POTENTIOMETER
2 MEGOHMS
.0005 MFD.
.00014 MFD. VAR. COND.
.0001 MFD.
STATOR
ROTOR
COIL B
.000035 MFD. MIDGET VAR. CONDENSER
AERIAL
10,000 OHMS
G3
G2
C
H
8 MFD. EACH
20,000 OHMS
0.2 MFD.
6C6 TUBE
350 OHMS
0.1 MFD.
GROUND
SWITCH
TO 110 VOLTS A.C. OR D.C.
GROUND TO CHASSIS AT THIS POINT ONLY

Plug-in coils shown will cover entire short-wave and broadcast band. In logging stations be sure to record number of coil which was used, since wave bands of coils will overlap somewhat.

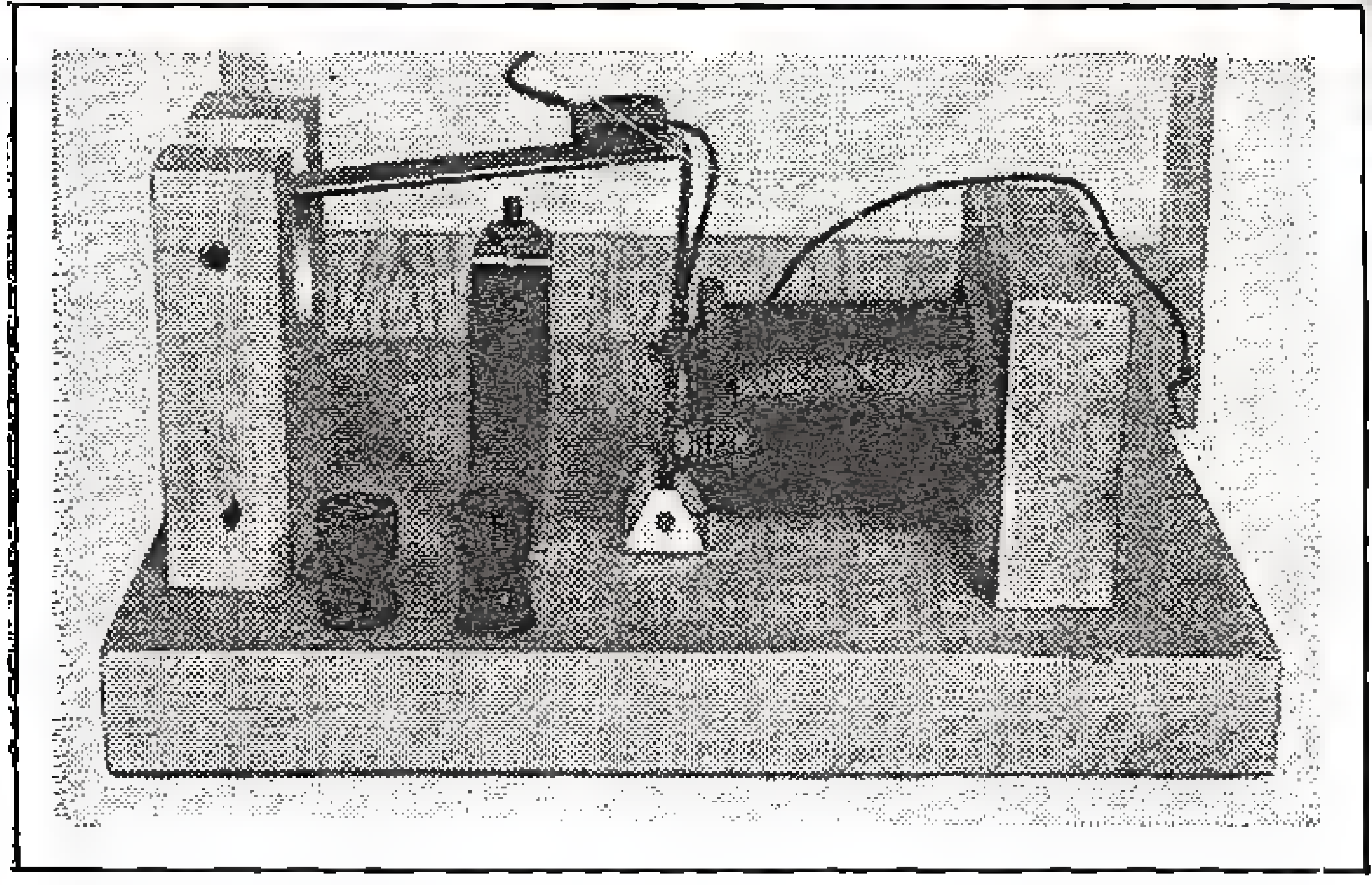
Standard 4-prong plug-in coils are sold by radio supply houses, or can be wound upon radio tube bases to specifications shown here. For broadcast band coils use standard plug-in coil forms. Wire size is immaterial; small wire, perhaps even No. 36, is needed to get necessary turns on larger coils.

Schematic circuit diagram of set is shown here for those who prefer to plan their own arrangement of parts. Filter resistor of 10,000 ohms may be replaced by standard filter choke if a.c. hum comes through phones. In tuning set, locate station with tuning dial, then adjust regeneration potentiometer until set is just ready to break into regeneration squeal. Antenna condenser need be tuned only for weak short wave stations. Note that set wiring is grounded to chassis at one point only.

Amaze Friends with this Sound Robot



By simply clapping hands in front of sound robot device, amateur electrical wizard sets fan in motion, shuts off lights.

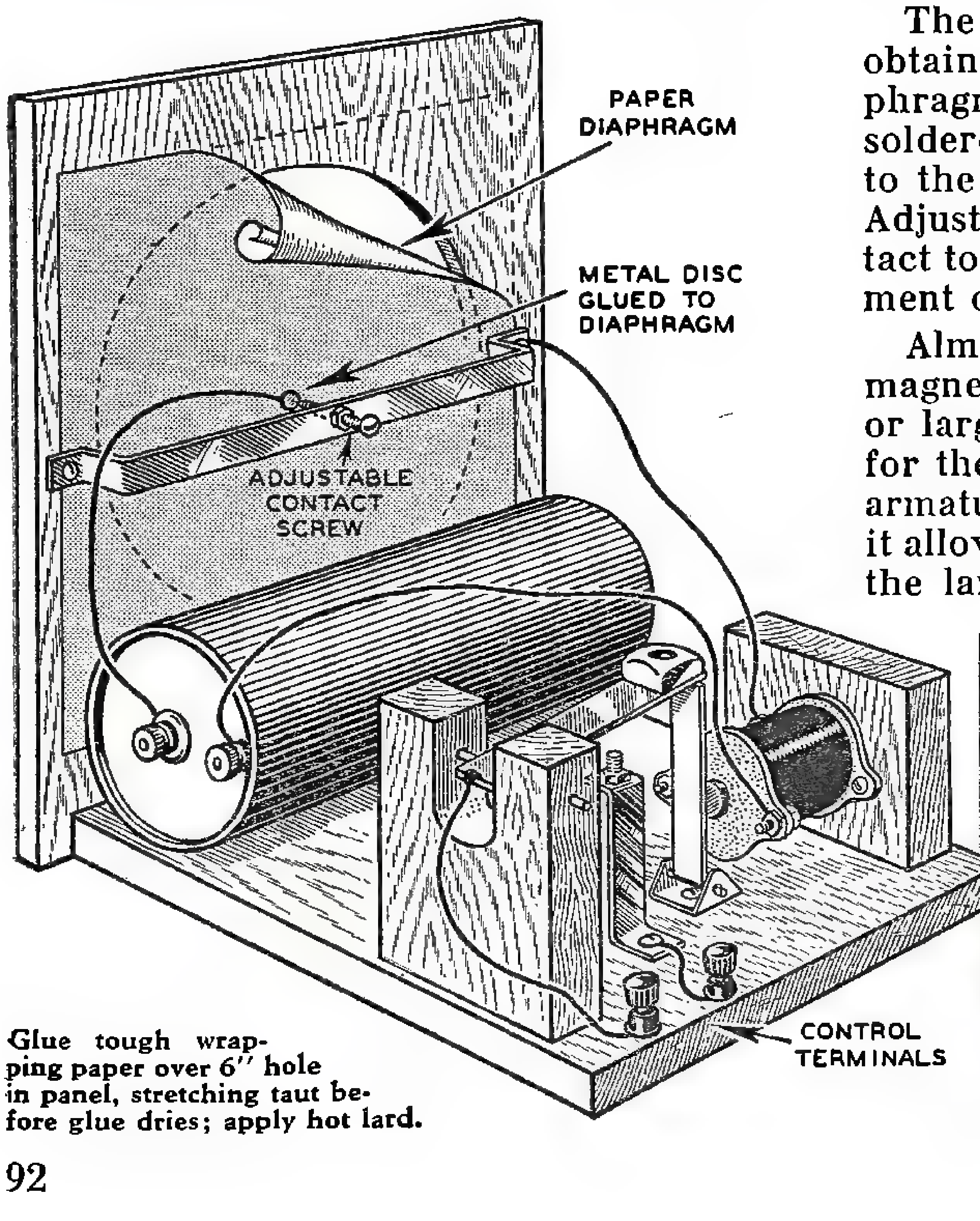


Above photo shows construction of simple tripping relay.

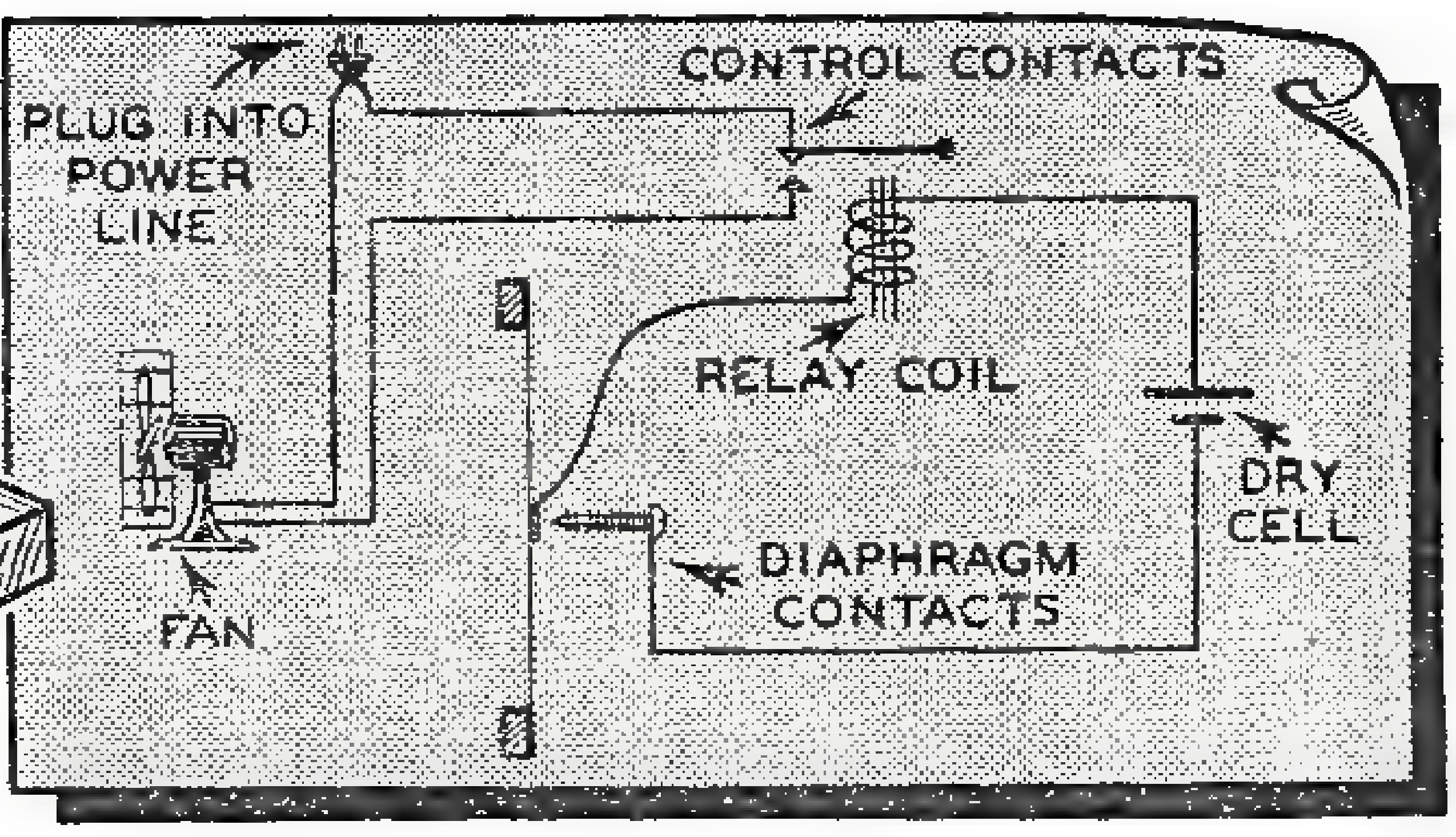
STEPPING up to a mysterious oiled paper diaphragm, the amateur electrical wizard mumbles unintelligible Greek words, suddenly claps his hands. Room lights go out almost instantly, and an oscillating electric fan throws its turbulent air blast over the faces of surprised friends.

The sound robot is made from easily obtainable materials. After the paper diaphragm is in place, a thin metal disc having soldered to it a fine wire lead is attached to the center with a drop of sealing wax. Adjust the pointed screw of the fixed contact to touch this disc at the slightest movement of the diaphragm.

Almost any magnet coil or door bell magnet having around 100 turns of No. 22 or larger magnet wire will be satisfactory for the trip relay. As the soft iron hinged armature is pulled forward by the magnet, it allows the weighted lever to drop, closing the large contacts which control the fan.

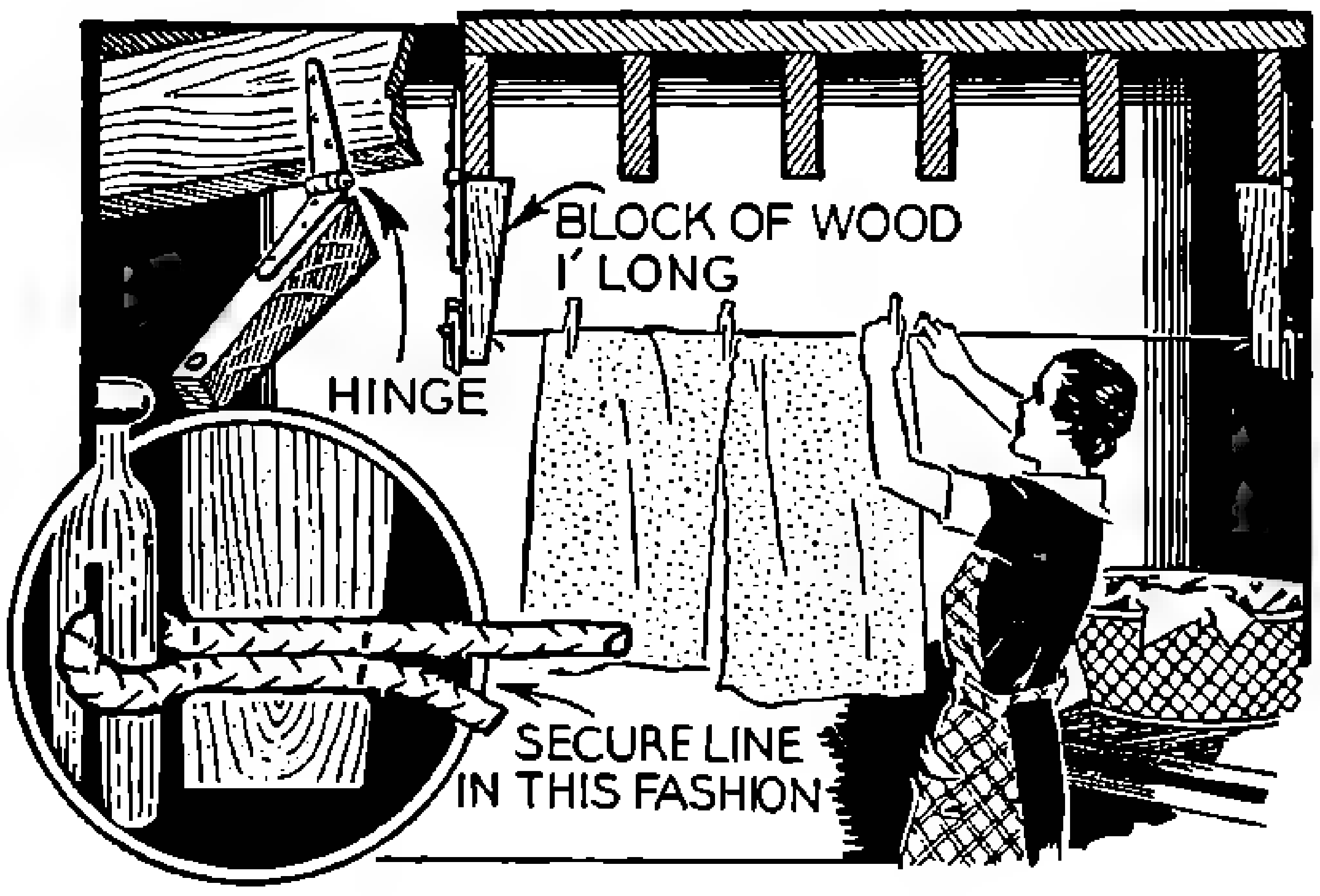

PAPER DIAPHRAGM
METAL DISC GLUED TO DIAPHRAGM
ADJUSTABLE CONTACT SCREW
CONTROL TERMINALS

Glue tough wrapping paper over 6″ hole in panel, stretching taut before glue dries; apply hot lard.


PLUG INTO POWER LINE
CONTROL CONTACTS
RELAY COIL
DRY CELL
DIAPHRAGM CONTACTS
FAN

Circuit diagram of sound robot. Paper diaphragm set in vibration by sound waves closes relay coil circuit, and control contacts start electric fan.

HELPFUL IDEAS FOR HOUSEWIVES

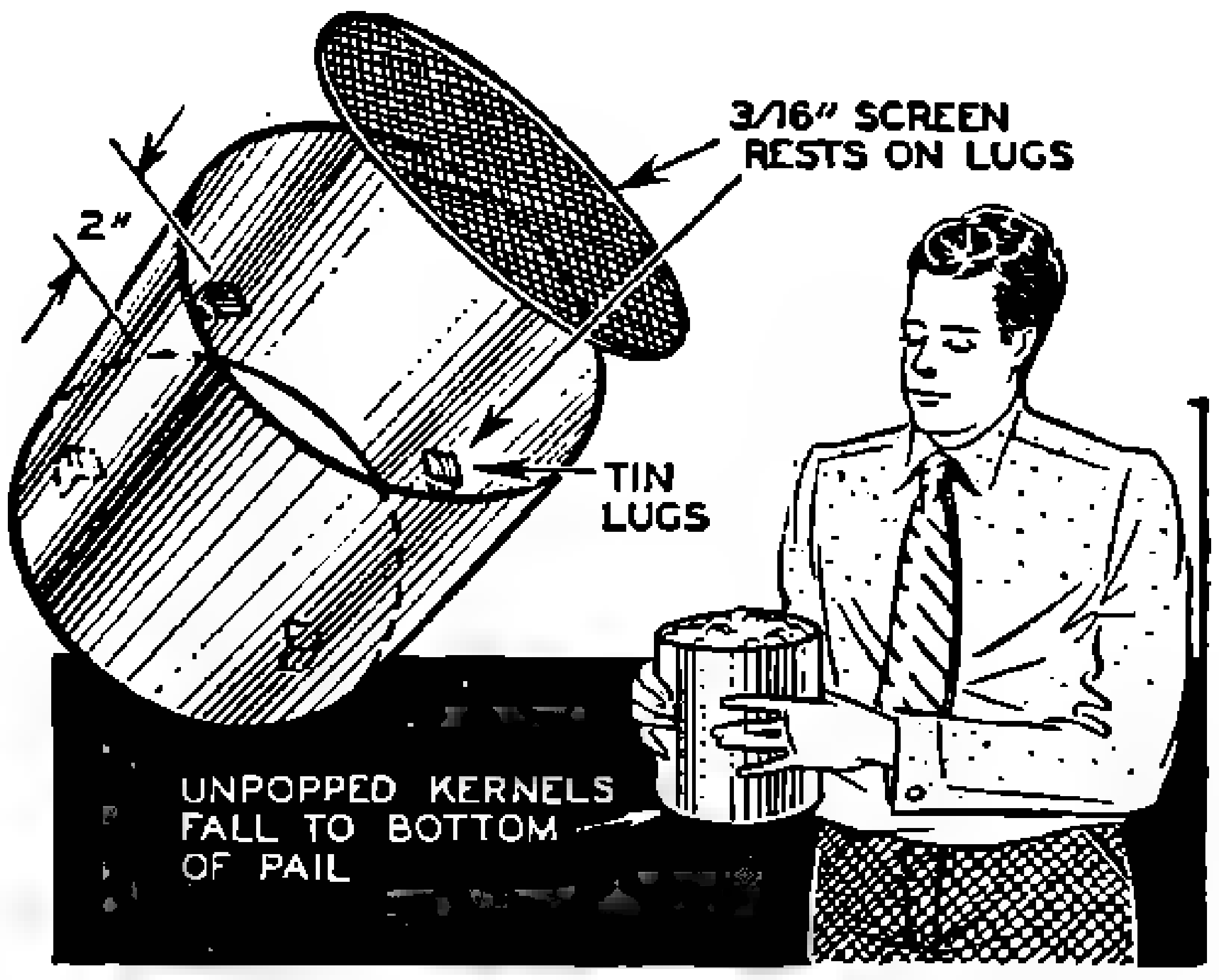

BLOCK OF WOOD
1' LONG
HINGE
SECURE LINE
IN THIS FASHION

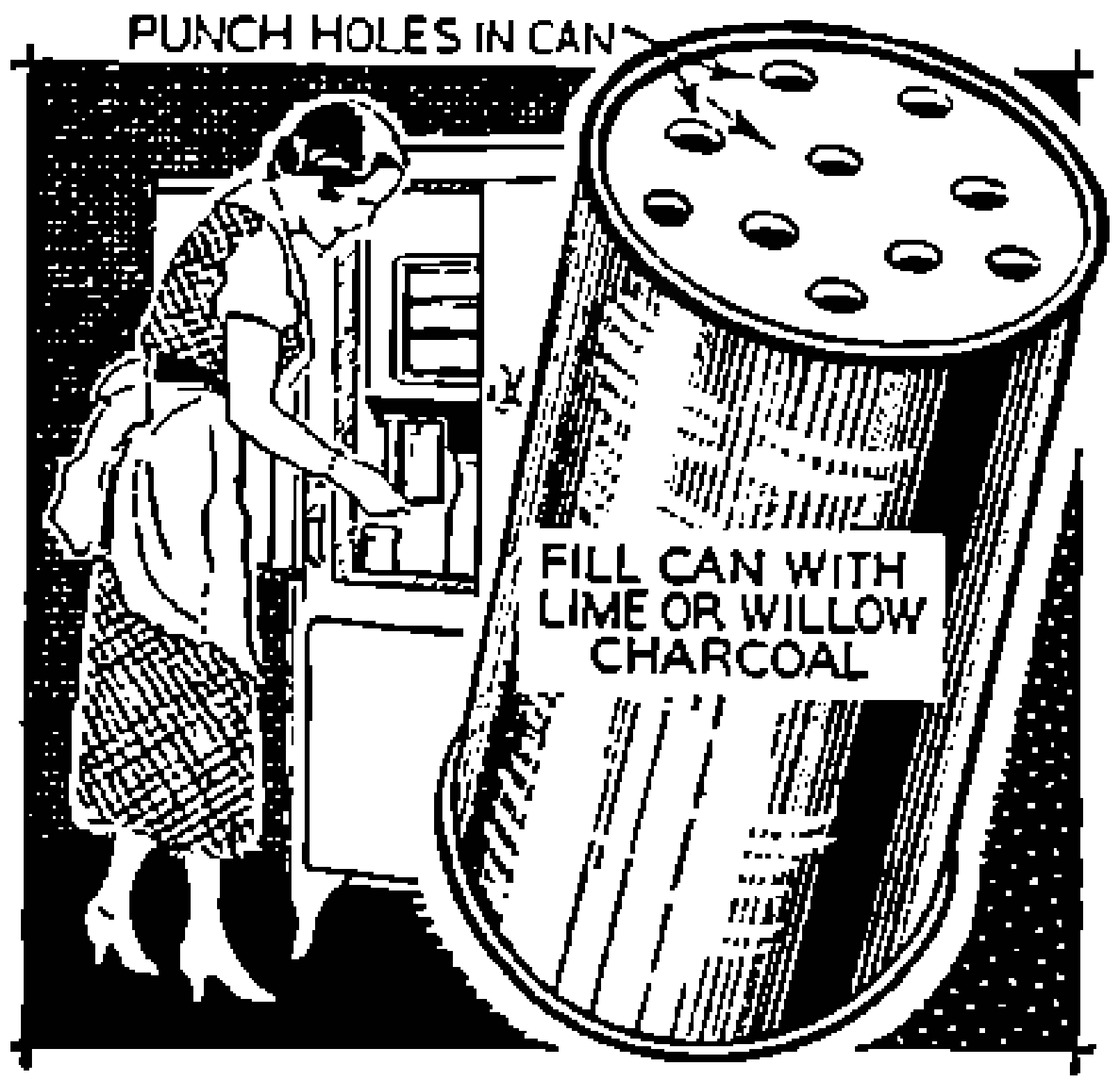
Clothesline Support for Basement

A CLOTHESLINE can quickly be strung up and taken down in the basement if these hinged extensions are mounted on the rafters. Pieces of wood one foot long are hinged to the rafters as shown at the left, and ½-inch holes drilled in the lower end of each arm. Rivet the hinge pins enough so the extension arms will stay up out of the way when the line is not in use. Push the doubled-up line through the hole, as shown.—C. J. Haas.

Sifter Removes Hard Kernels from Popcorn

UNPOPPED kernels of popcorn may be removed in a jiffy with this improvised sifter. Neatly round off the top edge of a one gallon tin can, then solder small metal lugs to the inside of the can at a height of about two inches above the bottom. Cut from a piece of 3/16"x3/16" galvanized screen a circular piece which will just fit into the can and rest on the lugs. Cover of can may be used instead of screen if it is punctured with 3/16" diameter holes.—J. Hora.


2"
3/16" SCREEN
RESTS ON LUGS
TIN
LUGS
UNPOPPED KERNELS
FALL TO BOTTOM
OF PAIL

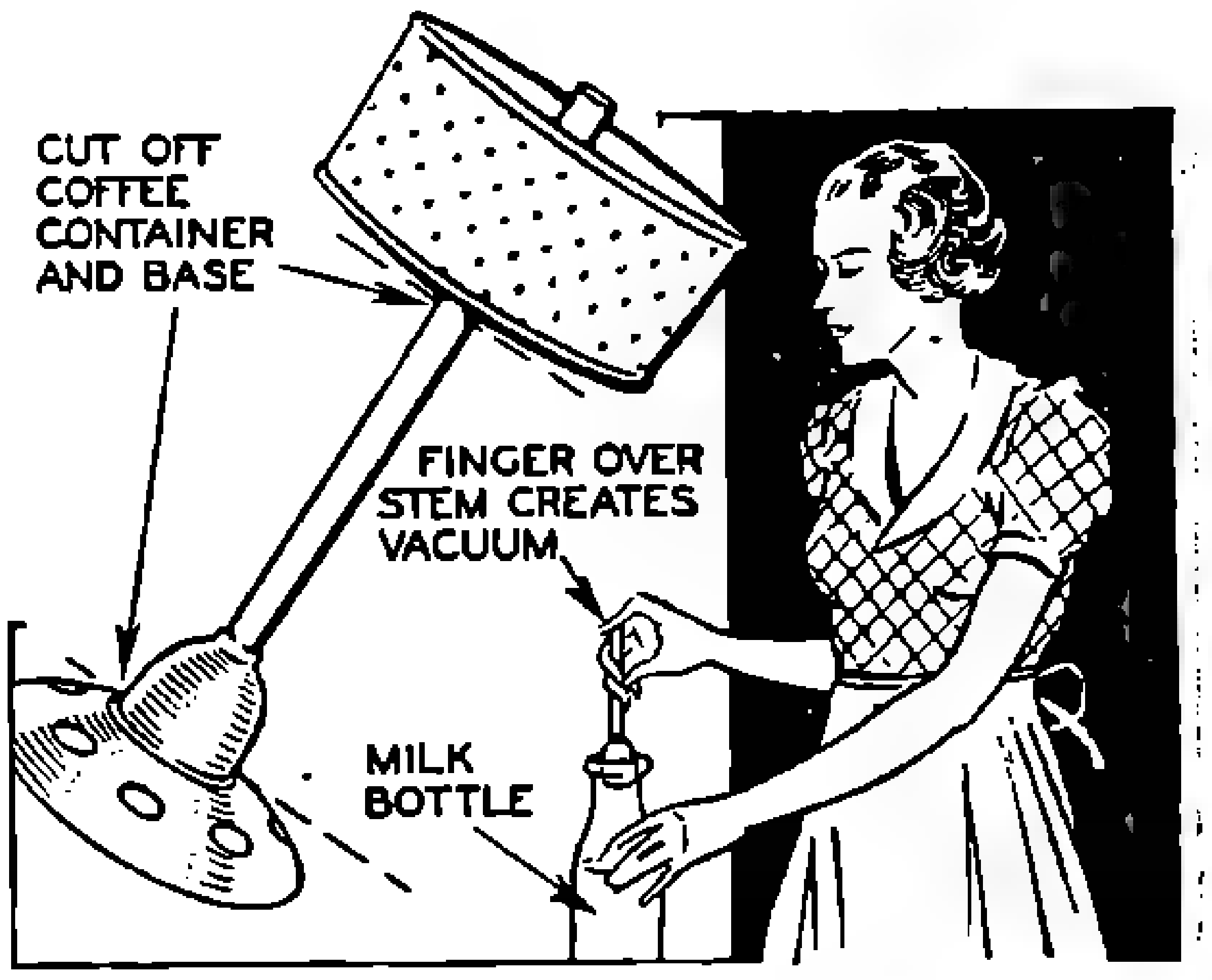

PUNCH HOLES IN CAN
FILL CAN WITH
LIME OR WILLOW
CHARCOAL

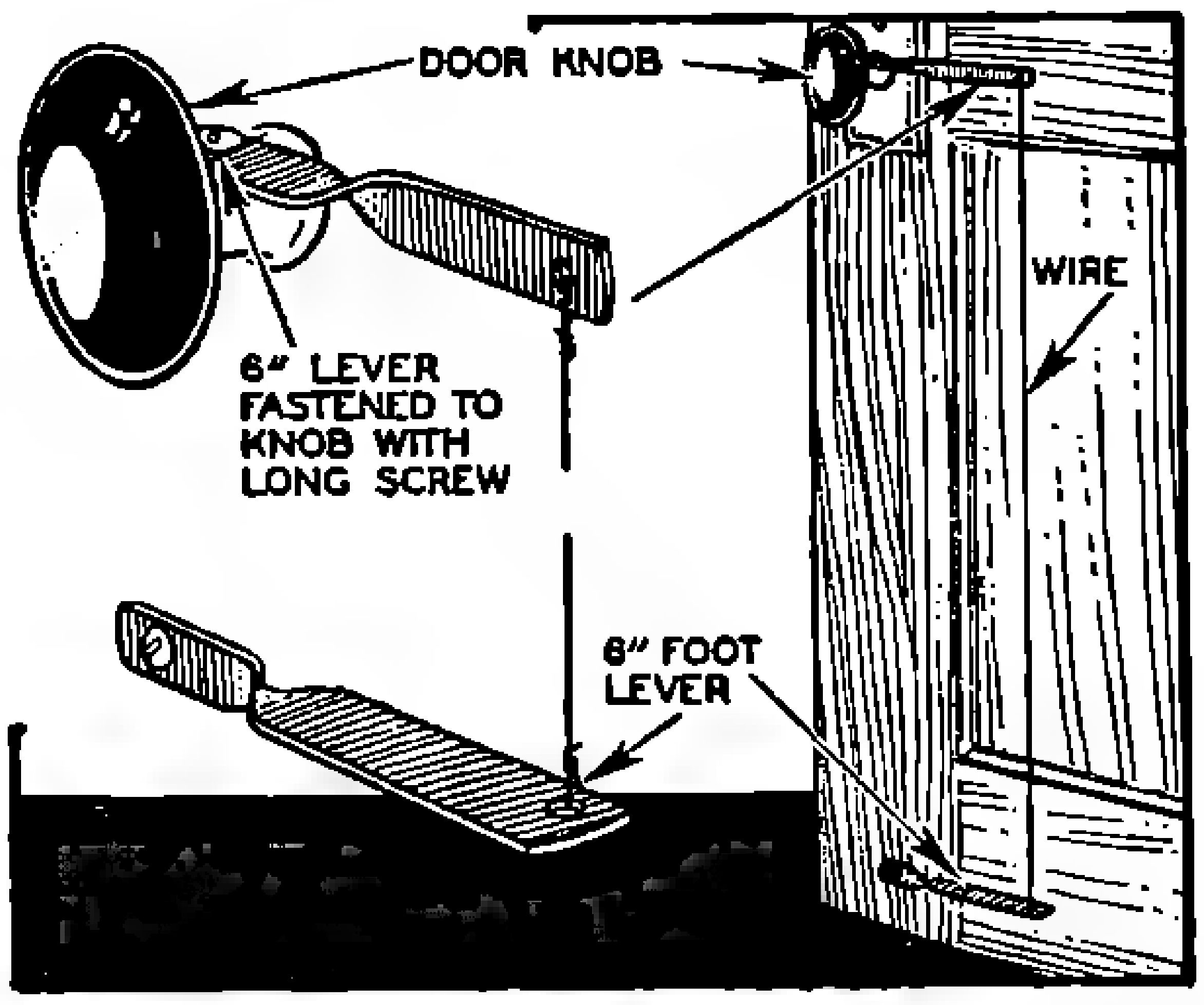
Simple Charcoal Deodorizer for Your Refrigerator

THIS inexpensive deodorizer will effectively absorb the disagreeable odors emitted from foods stored in the refrigerator, and at the same time keep meats in good condition. Punch a number of small holes in an empty baking-powder can. Fill the can with either unslaked lime or willow charcoal, then place it in the refrigerator. Replace contents occasionally.—A. J. Kukwa.

Percolator Tube Is Good Cream Catcher

WHERE pure cream is to be skimmed off the top of a bottle of milk, this inexpensive cream-catcher will be welcomed. Saw off the coffee compartment from the inside unit of a discarded percolator, and cut away the bottom flange. To use, lower the tube, bulb end down, into the cream as far as the milk line, press the finger over the upper end of the tube, and lift out. Almost all of the cream in the bottle can be removed in this manner without disturbing the milk.—A. H. Waychoff.


CUT OFF
COFFEE
CONTAINER
AND BASE
FINGER OVER
STEM CREATES
VACUUM
MILK
BOTTLE

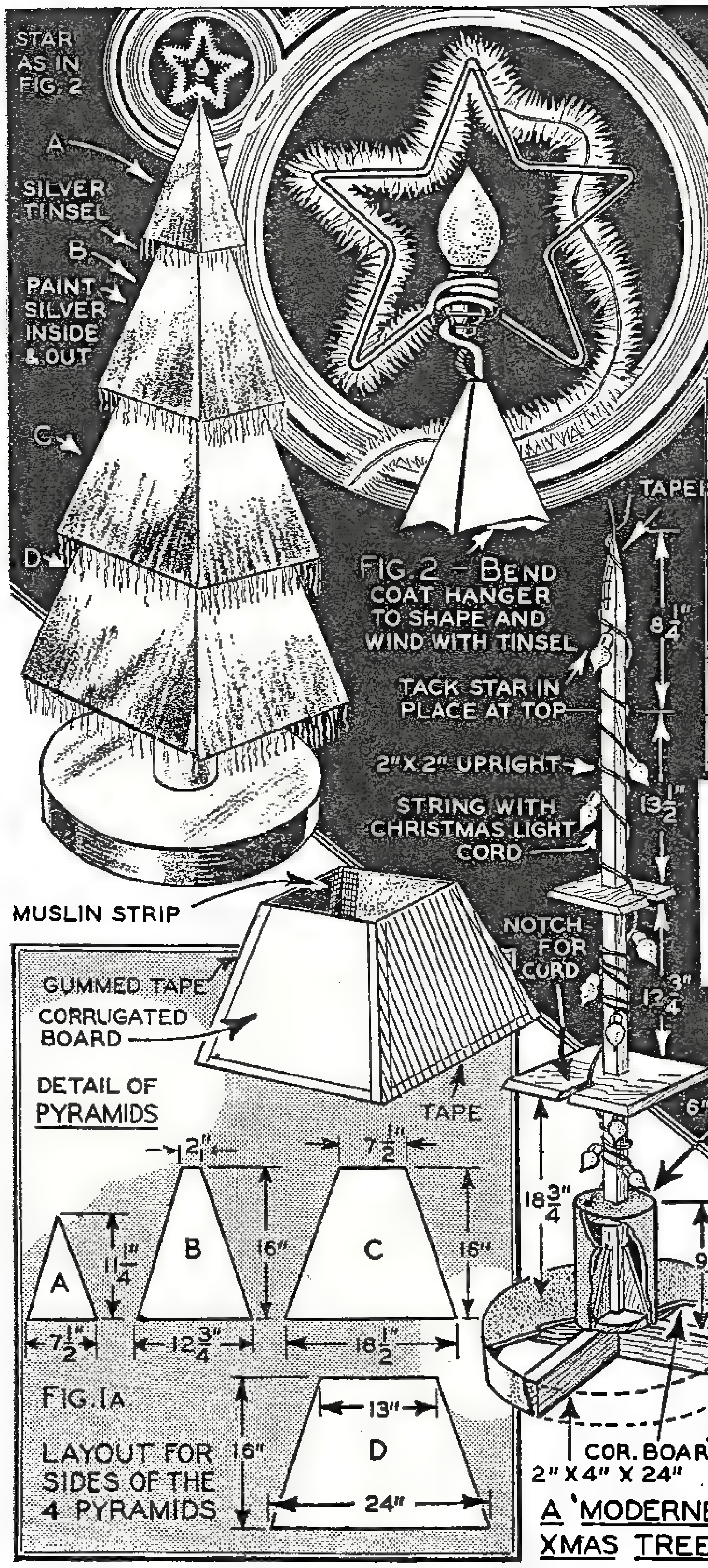

DOOR KNOB
6" LEVER
FASTENED TO
KNOB WITH
LONG SCREW
WIRE
6" FOOT
LEVER

Turn Door Knob With Handy Foot Pedal

A FOOT-OPERATED lever for turning door knobs will prove handy on those doors which must be frequently opened when carrying in trays, packages, wood, or ashes. A six-inch long lever is fastened to the door knob with a bolt a bit longer than that used to hold the knob in place. From the outer end of this lever a wire is run to another lever mounted about five inches above the floor and serving as a foot pedal. Pressure on this bottom lever will release the catch, allowing door to be pushed open. If door fits too tightly, it may be necessary to plane it down a small amount on sides and ends.—H. F. Throsel.

Christmas LIGHTING Effects

Electrically lighted Yuletide decorations in "moderne" design add a gala holiday aspect to the exterior of any home. The novel effects portrayed here are easily made in the home workshop at little expense.


STAR AS IN FIG. 2
A
SILVER TINSEL
B
PAINT SILVER INSIDE & OUT
C
D
FIG. 2 – BEND COAT HANGER TO SHAPE AND WIND WITH TINSEL
TAPER
8¼"
TACK STAR IN PLACE AT TOP
2"X2" UPRIGHT
STRING WITH CHRISTMAS LIGHT CORD
13½"
NOTCH FOR CORD
12¾"
MUSLIN STRIP
GUMMED TAPE
CORRUGATED BOARD
DETAIL OF PYRAMIDS
TAPE
6" DI.
18¾"
9"
2"
7½"
11¼"
16"
16"
A
B
C
7½"
12¾"
18½"
FIG. 1A
LAYOUT FOR SIDES OF THE 4 PYRAMIDS
16"
13"
D
24"
COR. BOARD
2"X4" X 24"
A 'MODERNE' XMAS TREE

Concealed lights of different colors illuminate silvered pyramids of "moderne" Christmas tree, construction of which is shown above. Frame of tinsel star is coat hanger.

OUR Forefathers placed a lighted candle in the window on Christmas Eve to flicker a Yuletide message of hospitality to wayfarers, but the custom gradually fell into disuse. Recently it was revived in a more modern form, the electrically lighted candle. The custom is gaining favor again, and in some communities prizes are offered for the most elaborate and novel effects. Here are a few suggestions which may be followed indoors as well as outdoors in your effort to brighten the holiday season.

A lighted Christmas scene, Fig. 6, gives

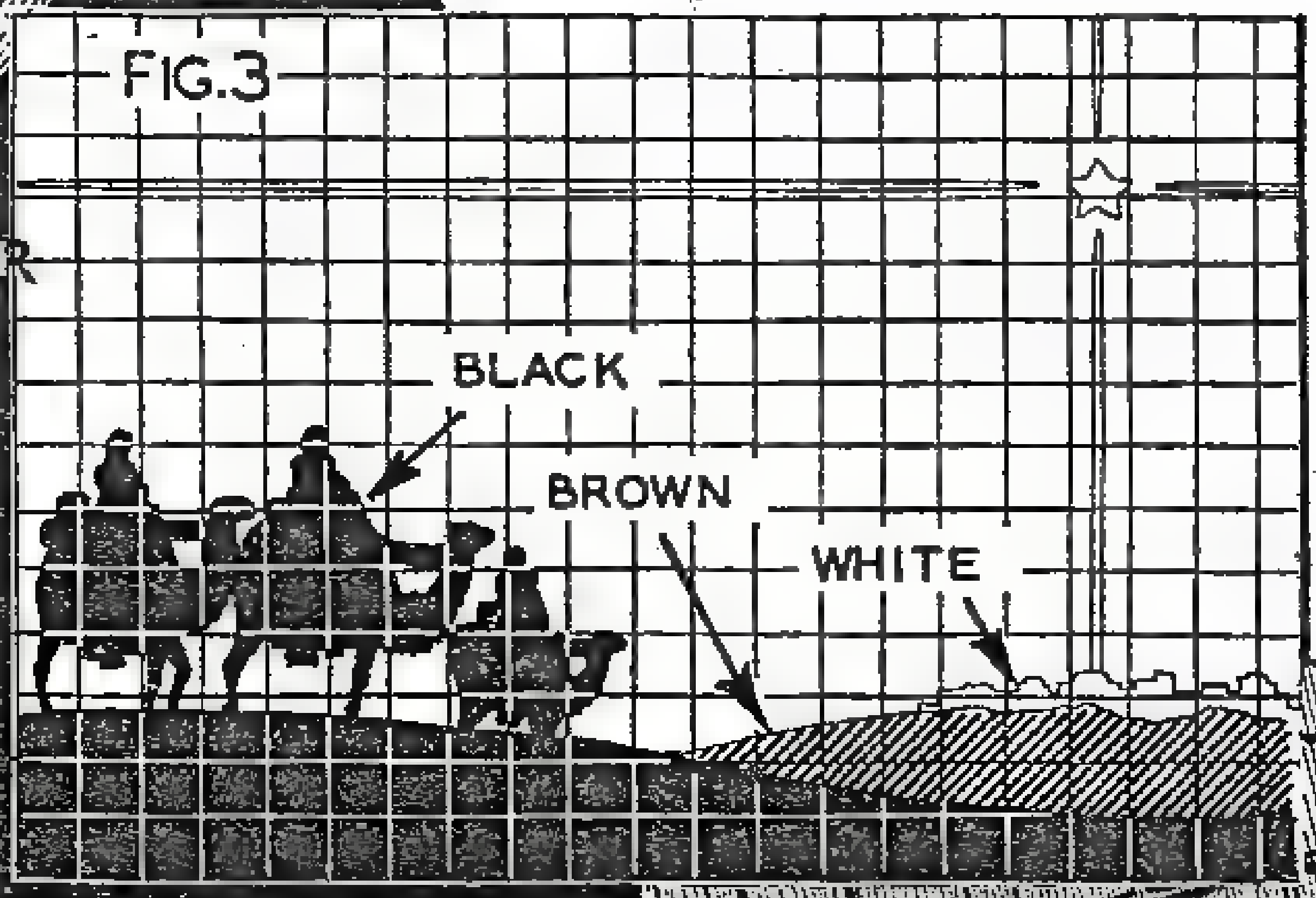
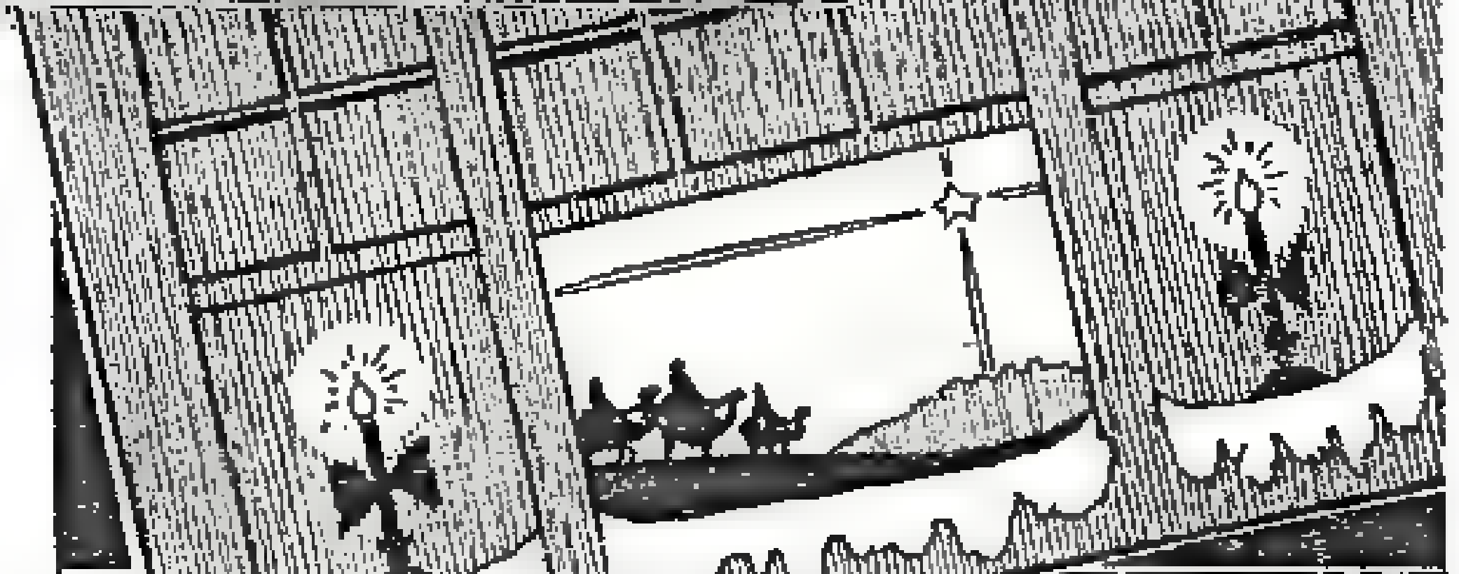


FIG. 3
BLACK
BROWN
WHITE

"Three Wise Men" scene with candles is used in alcoves having three windows. Squares over design aid in transferring.



Below is squared paper design for "Merry Christmas" shadow box intended for use on lawn or the house roof.

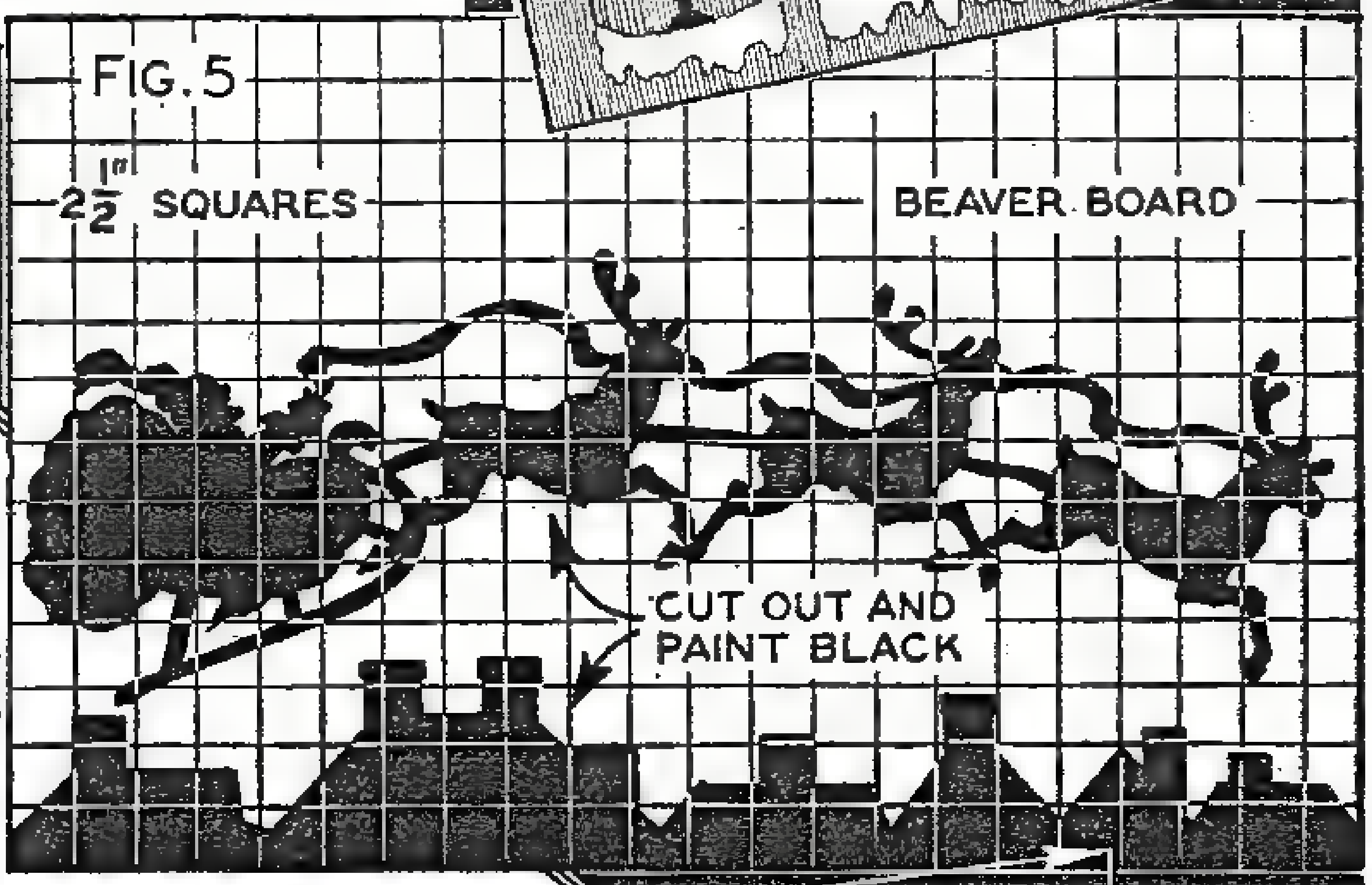
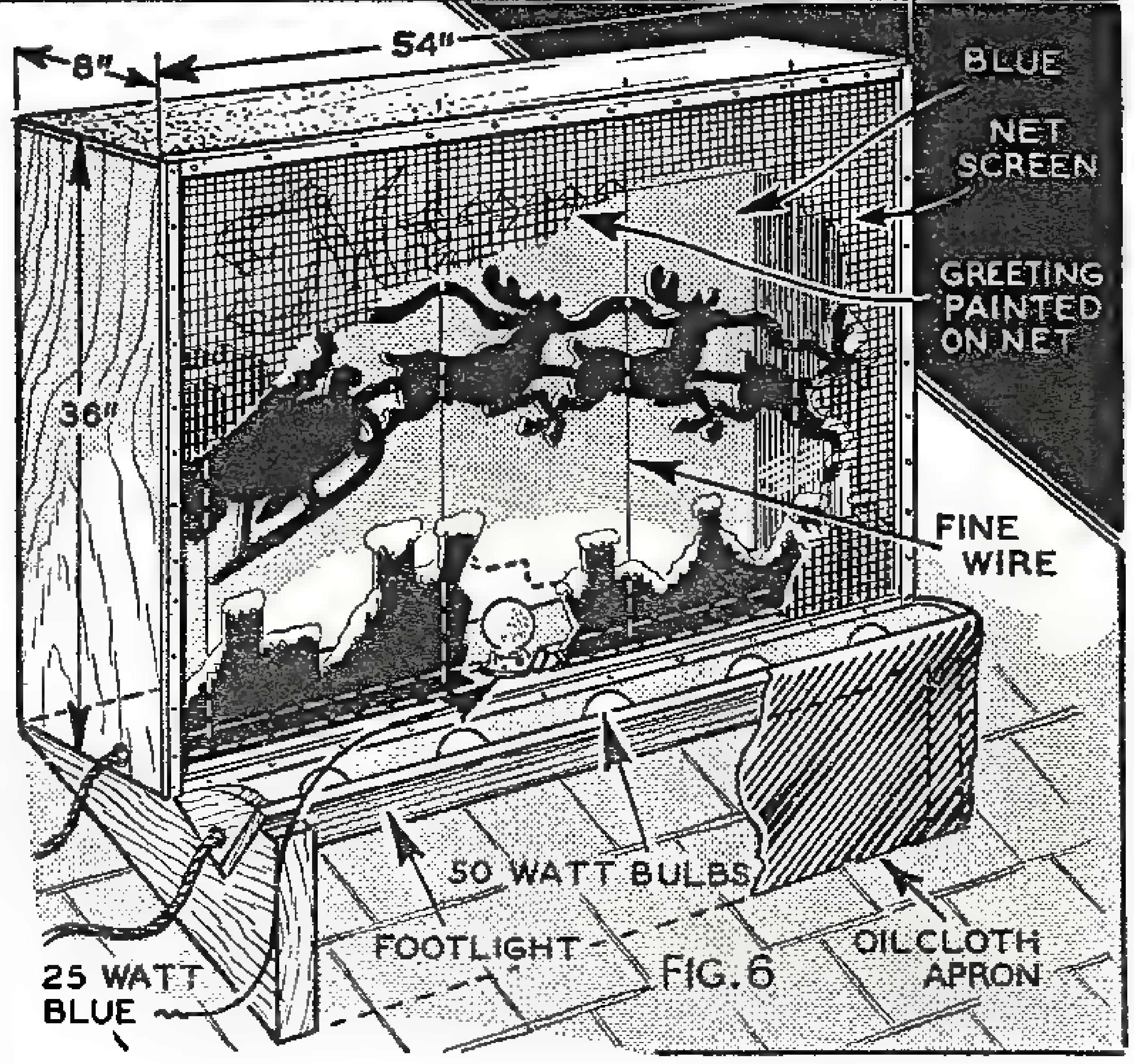


FIG. 5
2½" SQUARES
BEAVER BOARD
CUT OUT AND PAINT BLACK


8"
54"
BLUE
NET SCREEN
GREETING PAINTED ON NET
36"
FINE WIRE
50 WATT BULBS
FOOTLIGHT
FIG. 6
OILCLOTH APRON
25 WATT BLUE

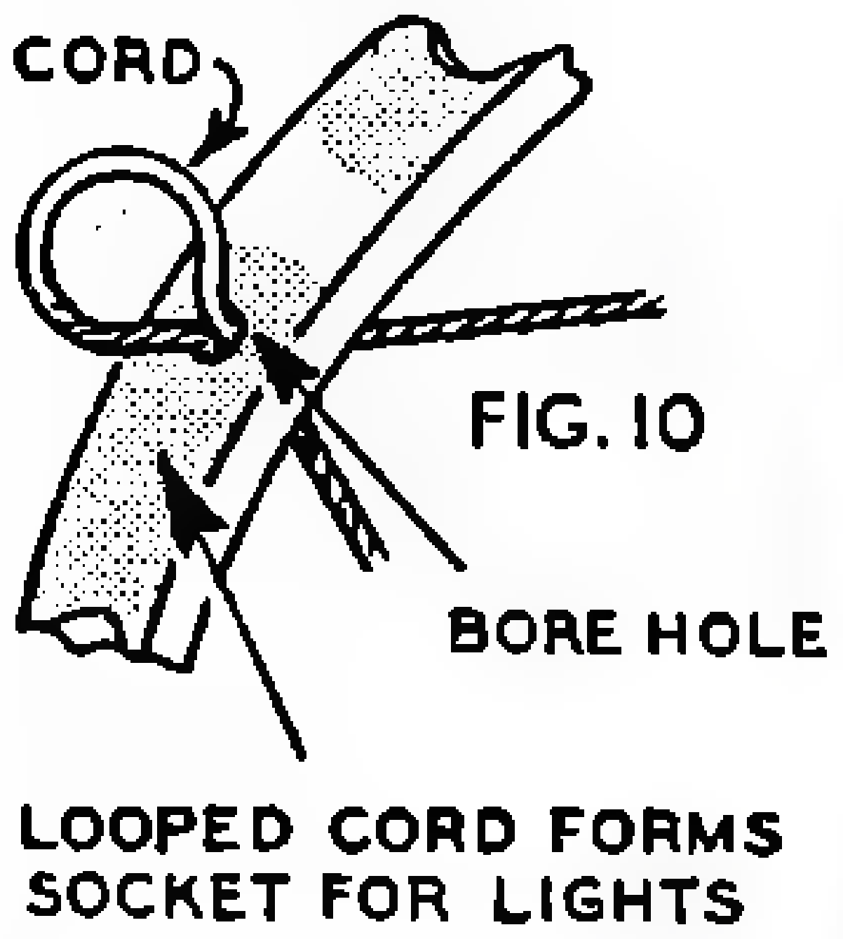
for the MODERN HOME

CHRISTMAS FLOODLIGHTING

BIRCH TREES around the house stand out best when illuminated with red floodlights.
BLUE SPRUCE trees require blue floodlighting.
EVERGREENS of other varieties stand out with either red or blue illumination.
HOME itself uses lights same color as walls.

by DAVID A. BROWN

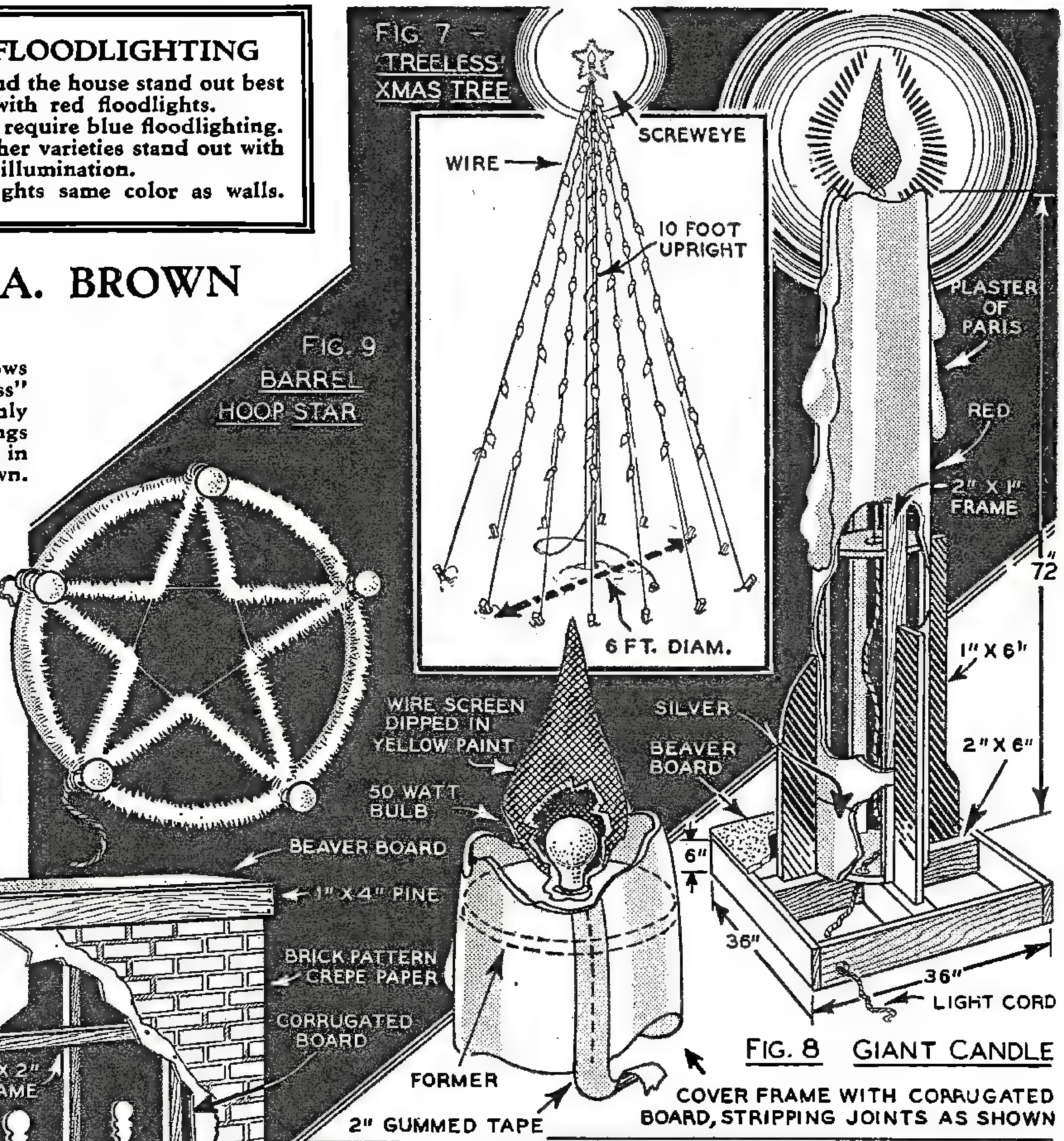
Illustration at right shows how to make "treeless" Xmas tree by using only a ten-foot mast and strings of lights, to be used in a dark corner of your lawn.



CORD
BORE HOLE

FIG. 10

LOOPED CORD FORMS SOCKET FOR LIGHTS



WIRE
SCREWEYE
10 FOOT UPRIGHT
6 FT. DIAM.
PLASTER OF PARIS
RED
2" X 1" FRAME
72"
1" X 6"
2" X 6"
SILVER
BEAVER BOARD
WIRE SCREEN DIPPED IN YELLOW PAINT
50 WATT BULB
BEAVER BOARD
1" X 4" PINE
BRICK PATTERN CREPE PAPER
CORRUGATED BOARD
2" X 2" FRAME
6"
36"
36"
LIGHT CORD
FORMER
2" GUMMED TAPE

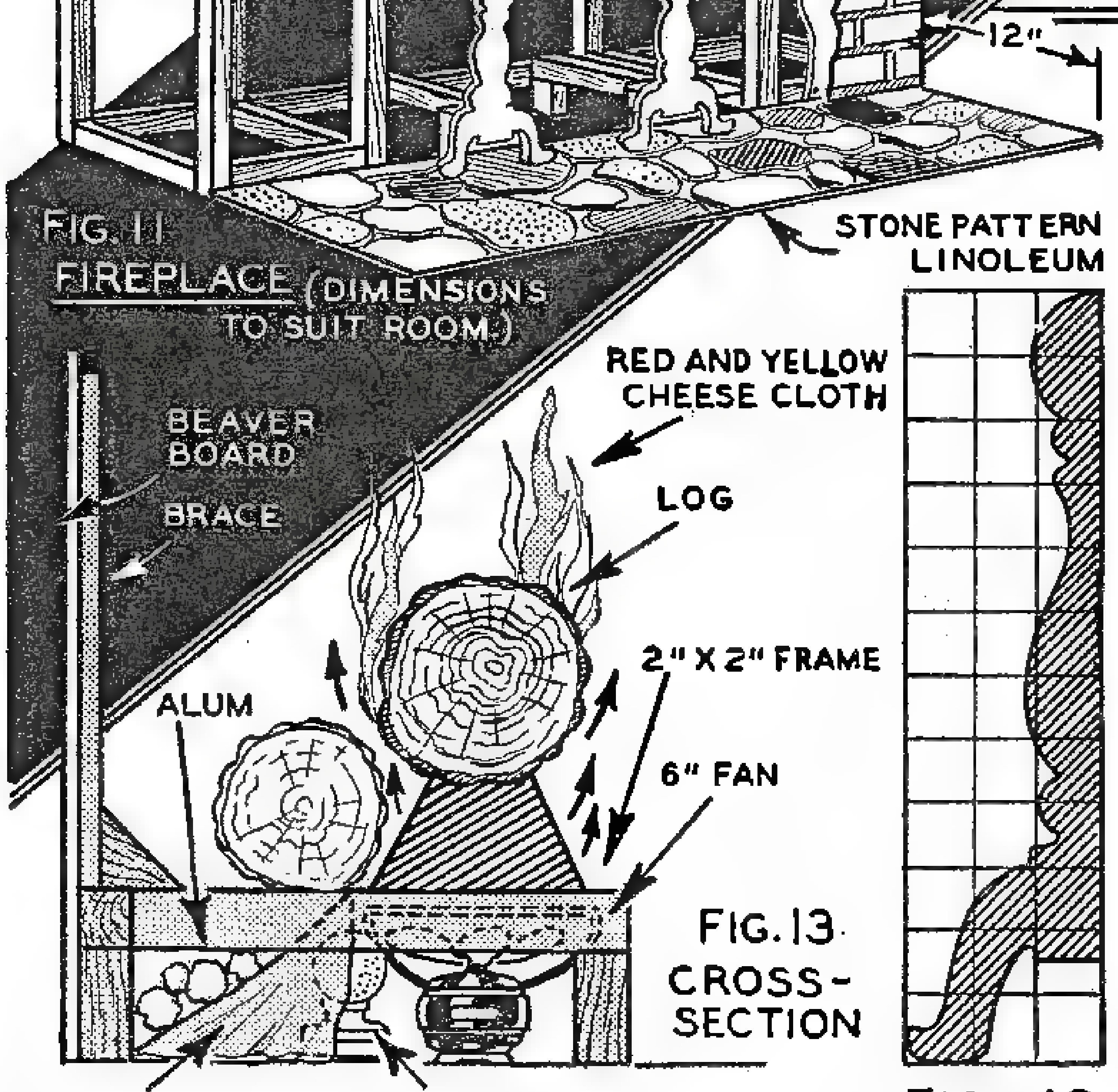
FIG. 7 — "TREELESS" XMAS TREE

FIG. 9 BARREL HOOP STAR

FIG. 8 GIANT CANDLE

COVER FRAME WITH CORRUGATED BOARD, STRIPPING JOINTS AS SHOWN

Giant candles are to be set on each side of doorway or gate. Screen dipped in yellow paint gives effect of candle flame.



12"
STONE PATTERN LINOLEUM
BEAVER BOARD
BRACE
RED AND YELLOW CHEESE CLOTH
LOG
ALUM
2" X 2" FRAME
6" FAN
RED CLOTH
50 WATT LAMP

FIG. 11 FIREPLACE (DIMENSIONS TO SUIT ROOM.)

FIG. 13 CROSS-SECTION

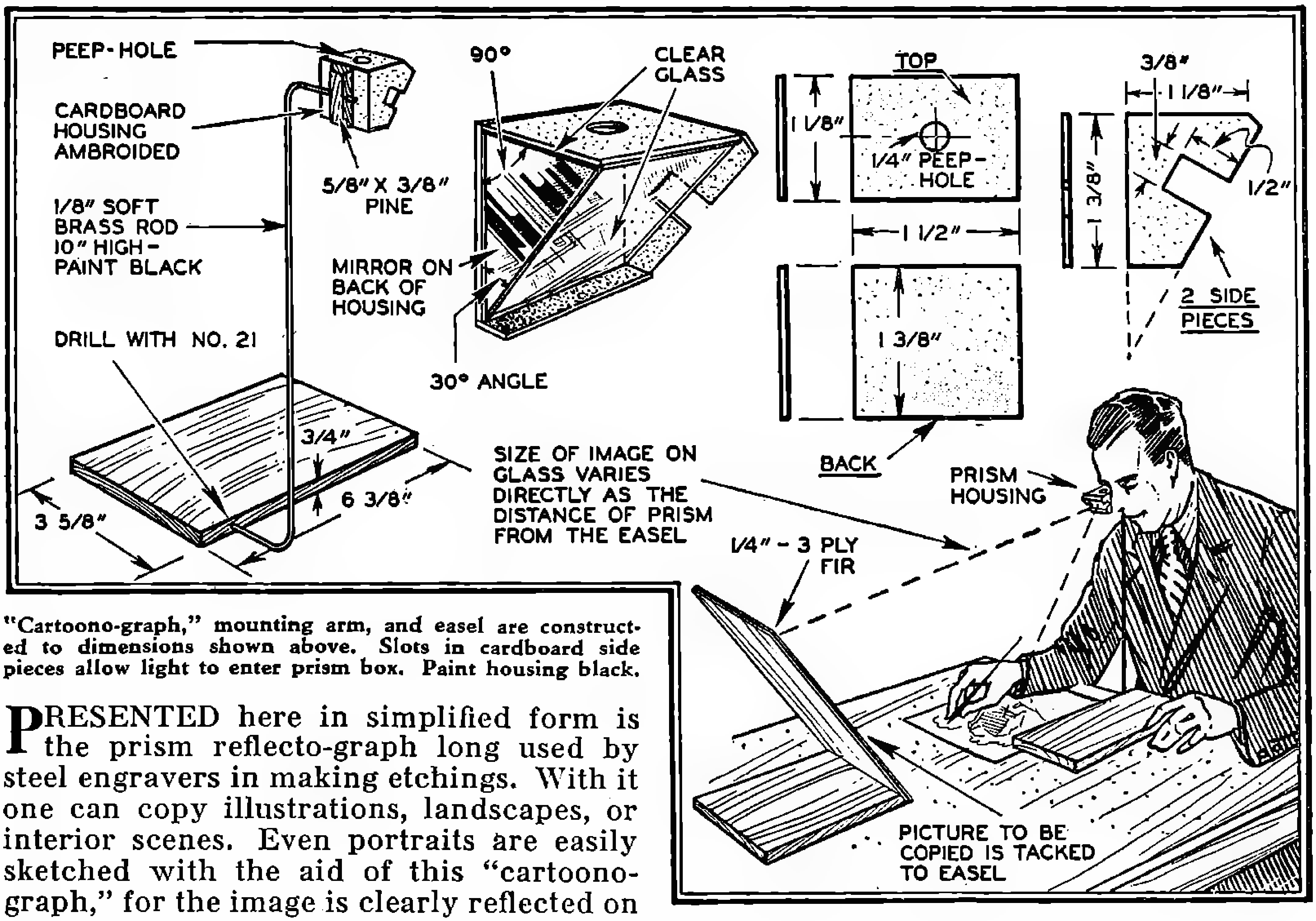
FIG. 12

Realistic fireplace with flickering flames is readily built up from light-weight materials. Cover with brick design crepe paper. Pattern for half-section of andiron is shown at right.

a startling and novel effect when used on the porch roof or lawn. A shadow box is constructed of light material 4′ 6″ x 3′ x 8″. The back is Beaver Board painted navy blue. Lay out Santa and the reindeer and the house tops on another sheet of Beaver Board about 4′ 6″ x 3′, marking it into the same number of squares as Fig. 5. Using the intersecting lines as guides draw the outlines, then cut out and paint black. Tack the house tops to wooden cleats nailed in place two inches back of the front edge of the box. The other group is fastened with strips of adhesive tape on the back to four fine wires stretched from top to bottom just back of the house tops. Tufts of cotton placed along the edges of the roofs give the effect of snow. Three 25-watt blue lights behind these figures will silhouette them

(Continued on page 123)

Copy Portraits or Scenes With Simple "Cartoono-Graph"


PEEP-HOLE
CARDBOARD HOUSING AMBROIDED
1/8" SOFT BRASS ROD 10" HIGH-PAINT BLACK
DRILL WITH NO. 21
5/8" X 3/8" PINE
90°
CLEAR GLASS
MIRROR ON BACK OF HOUSING
30° ANGLE
3/4"
6 3/8"
3 5/8"
SIZE OF IMAGE ON GLASS VARIES DIRECTLY AS THE DISTANCE OF PRISM FROM THE EASEL
TOP
1 1/8"
1/4" PEEP-HOLE
1 1/2"
1 3/8"
BACK
3/8"
1 1/8"
1/2"
1 3/8"
2 SIDE PIECES
PRISM HOUSING
1/4" - 3 PLY FIR
PICTURE TO BE COPIED IS TACKED TO EASEL

"Cartoono-graph," mounting arm, and easel are constructed to dimensions shown above. Slots in cardboard side pieces allow light to enter prism box. Paint housing black.

Locate "cartoono-graph" so light comes from one side. Image and white paper on table are seen through peephole.

PRESENTED here in simplified form is the prism reflecto-graph long used by steel engravers in making etchings. With it one can copy illustrations, landscapes, or interior scenes. Even portraits are easily sketched with the aid of this "cartoono-graph," for the image is clearly reflected on the drawing paper where it can be traced.

Odds and ends of glass and a bit of mirror are used to replace the expensive solid prism. Cut out the mirror for the back of the housing with glass cutters, or hold it under water and cut with shears. The top and front pieces, of clear glass, make up the other two faces of this hollow prism. The front piece, set at a 30 degree angle, will throw a better "ghost" image if covered with dust and fingerprints.

Old Revolver Serves as Table Lamp

AN INTERESTING desk or table lamp for the den can be made from an old revolver. Bolt the butt of the gun to a metal base, then fasten a lamp socket into the end of the barrel. The electric cord is run through the barrel to a switch so mounted that the lamp can be turned on and off by pulling the trigger.

The type of revolver that breaks for loading will give a lamp which is readily tilted.

Here's one version of a revolver lamp; cylinder may be removed as safety precaution. The trigger operates a switch.

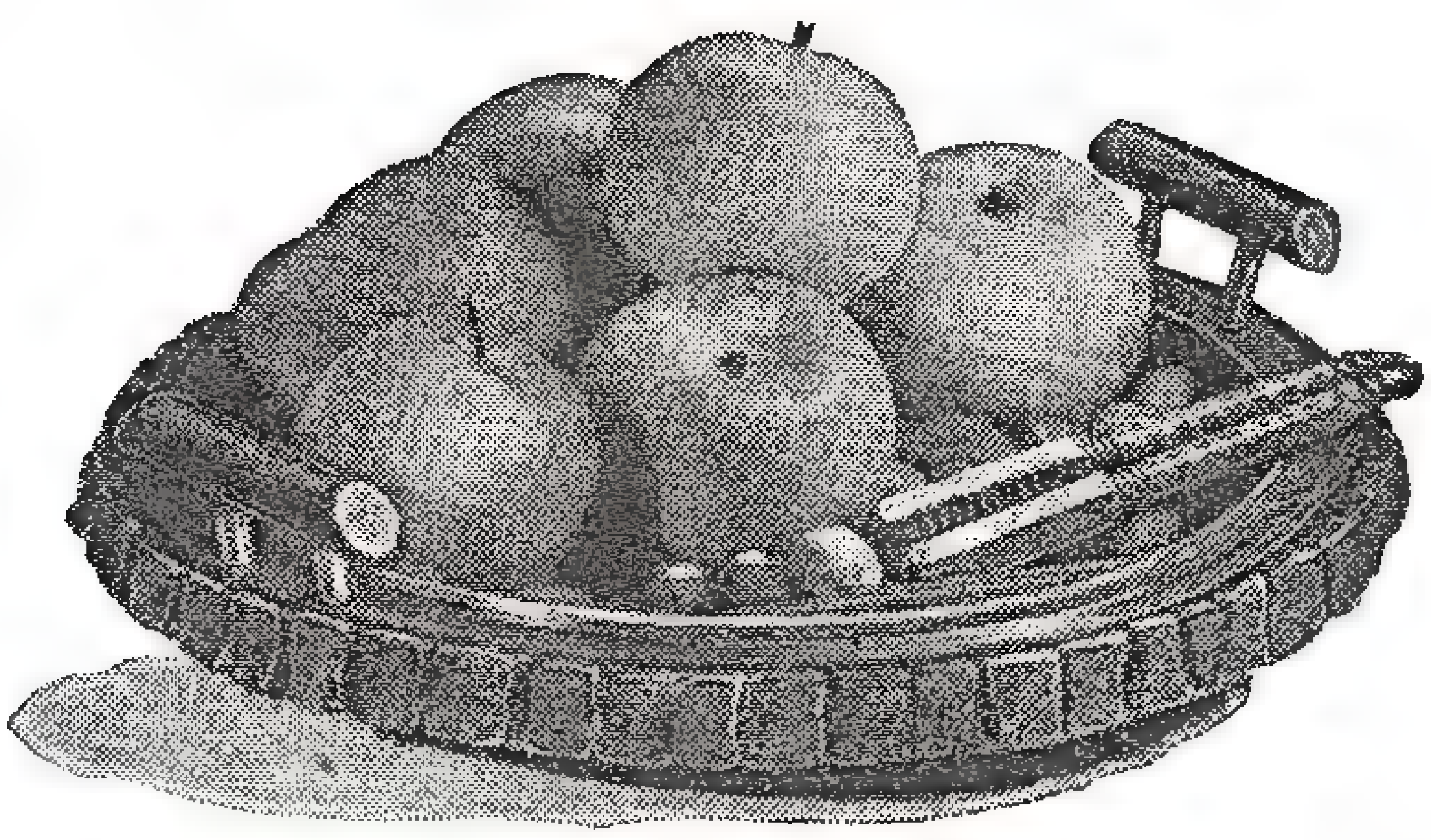
Make Bowls With Turned Log Slabs

DISCS of wood taken from the trunk of a tree can be turned out on the lathe to form novel and attractive fruit bowls. These slabs can be sawed out by hand, or picked up for almost nothing at a sawmill; select pieces which are as nearly round as possible, and with the bark unbroken.

Mount the slab on your lathe face-plate in the usual manner, and hollow out the face of the bowl to any desired depth.

After carefully sanding the bowl, apply a dark wood stain, then varnish.

Small branches are cut out to form handles, then glued after careful fitting into holes drilled in the rim of the bowl.



Attractive fruit bowls in rustic pattern are turned out on lathe from easily obtained log slabs. Apply clear lacquer to the bark, and any desired finish to remainder of bowl.

Ice Sled Has Sailing Wings

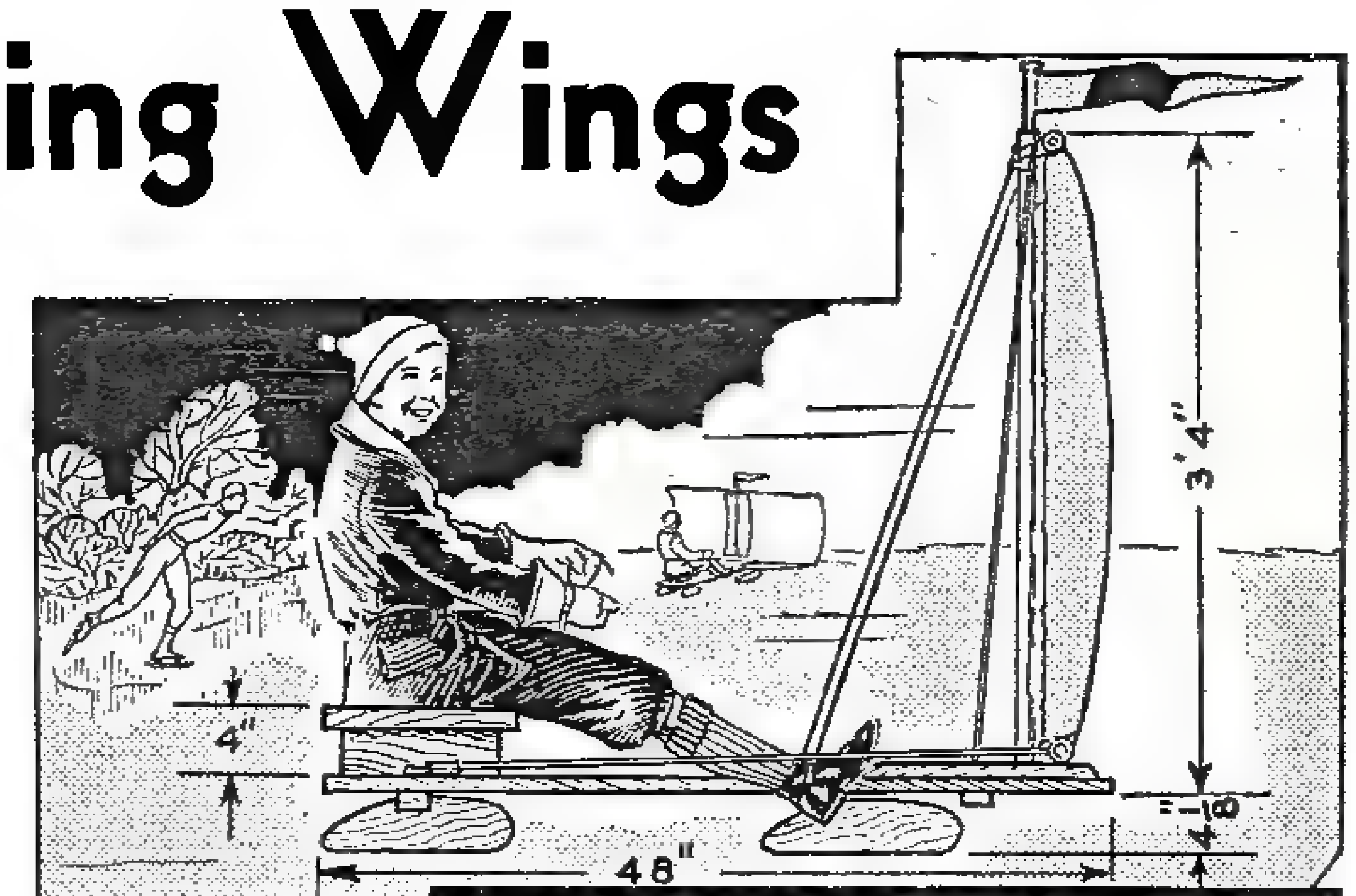
ON WINTRY days when the wind is brisk, this wing-sail sled will carry you to and fro on your favorite pond with breath-taking speed. The unusual wing-like sails, open in the center, give full vision ahead at all times, making this sled ideal where the ice is dotted with skaters.

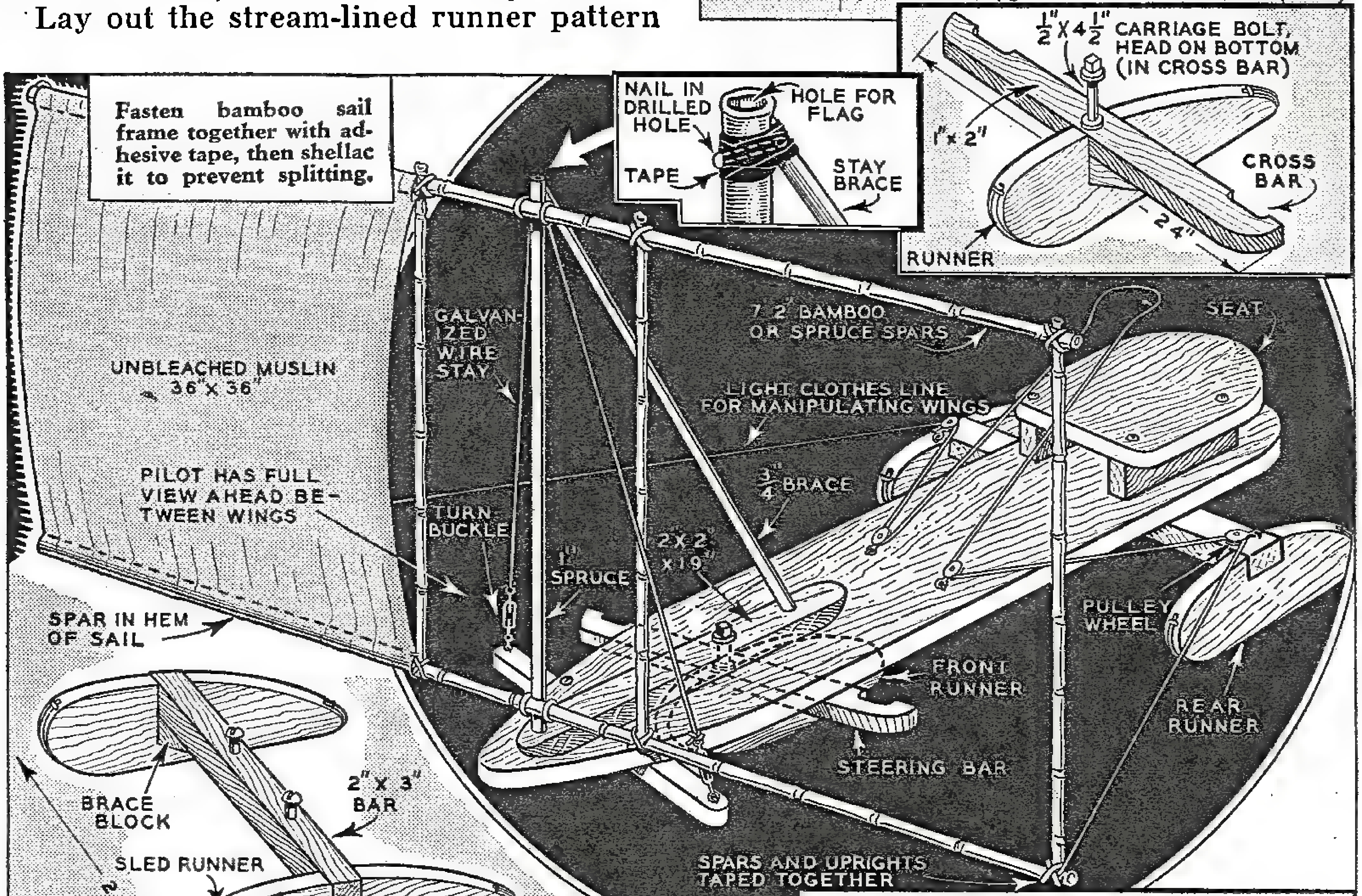
Light weight is achieved by using white pine throughout; hardwood runners are recommended, however, on rough ice.

Lay out the stream-lined runner pattern full size, then transfer it to your one-inch thick runner wood. A strip of 3/16" square cold-rolled steel, or even an old sled runner, is set into a groove cut into each runner, and fastened in place at the end curves with strong staples. A runner of this type can be kept sharp with a pocket skate-sharpener.

Assemble the different parts of the sled with wood screws. A bolt head is passed through the underside of the foot bar before fastening to the steering runner.

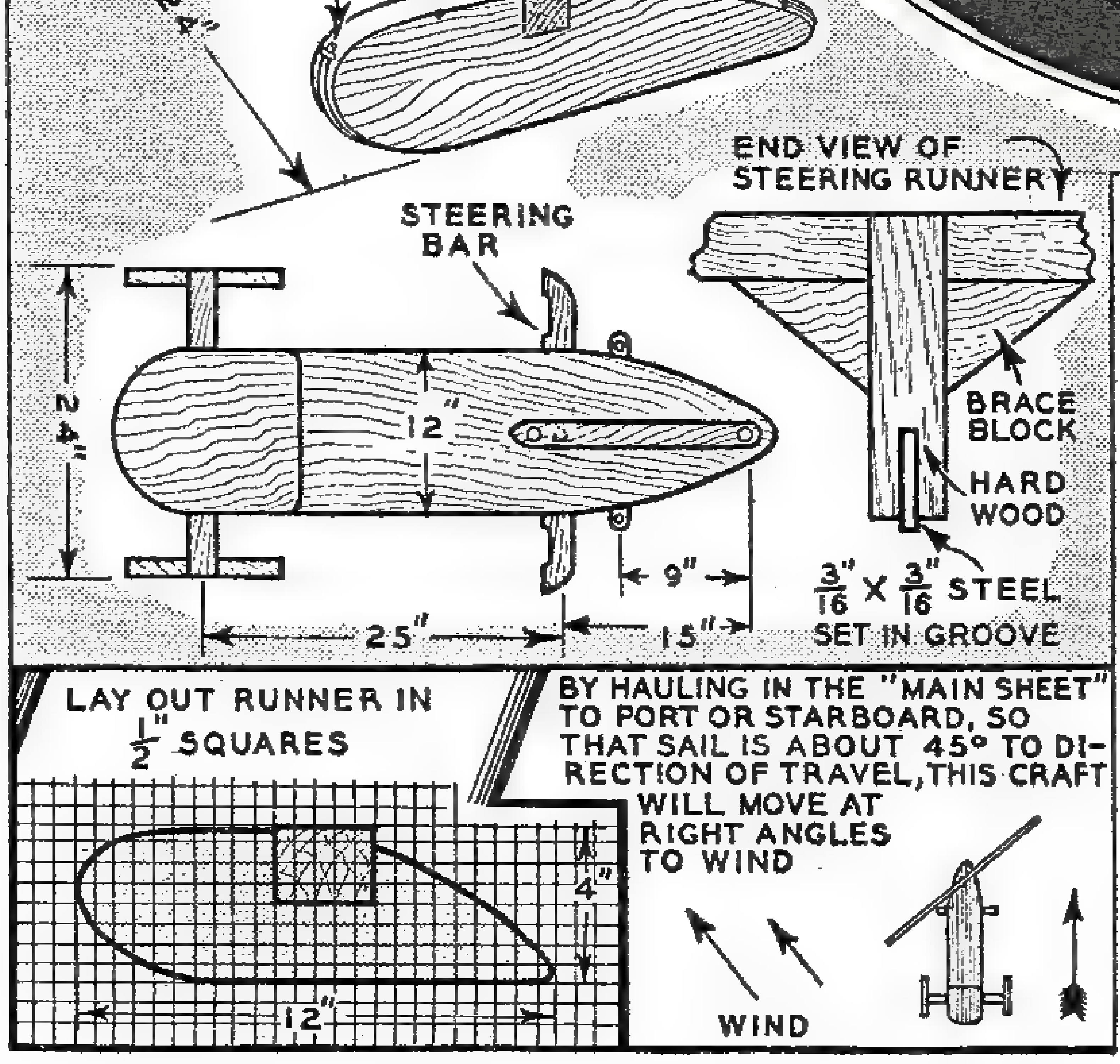
Bamboo is recommended for the sail spars and uprights, adhesive or friction tape being used to fasten the pieces together. For the mast a broomstick or any 1" diameter round stock may be used. Wire stays with turnbuckles keep the mast rigidly upright.




½" X 4½" CARRIAGE BOLT, HEAD ON BOTTOM (IN CROSS BAR)
1" x 2"
CROSS BAR
24"
RUNNER
NAIL IN DRILLED HOLE
HOLE FOR FLAG
TAPE
STAY BRACE
GALVANIZED WIRE STAY
7' 2" BAMBOO OR SPRUCE SPARS
SEAT
UNBLEACHED MUSLIN 36" X 36"
LIGHT CLOTHES LINE FOR MANIPULATING WINGS
PILOT HAS FULL VIEW AHEAD BETWEEN WINGS
¾" BRACE
TURN BUCKLE
1" SPRUCE
2 X 2" X 19"
SPAR IN HEM OF SAIL
PULLEY WHEEL
FRONT RUNNER
REAR RUNNER
STEERING BAR
BRACE BLOCK
2" X 3" BAR
SLED RUNNER
24"
SPARS AND UPRIGHTS TAPED TOGETHER

Fasten bamboo sail frame together with adhesive tape, then shellac it to prevent splitting.

Above dimensions are for 10-year-old; larger builders should increase distance between runners. Fasten spars to mast with leather thongs.


STEERING BAR
END VIEW OF STEERING RUNNER
24"
12"
25"
15"
9"
BRACE BLOCK
HARD WOOD
3/16" X 3/16" STEEL SET IN GROOVE
LAY OUT RUNNER IN ½" SQUARES
4"
12"
WIND

BY HAULING IN THE "MAIN SHEET" TO PORT OR STARBOARD, SO THAT SAIL IS ABOUT 45° TO DIRECTION OF TRAVEL, THIS CRAFT WILL MOVE AT RIGHT ANGLES TO WIND

Assembly of rear runners is shown above. Use unbleached muslin or any bright-colored cotton cloth for sails, and paint sled itself in contrasting bright color. Set sail at 45 degree angle to travel across wind or for tacking.

How to START Your Car

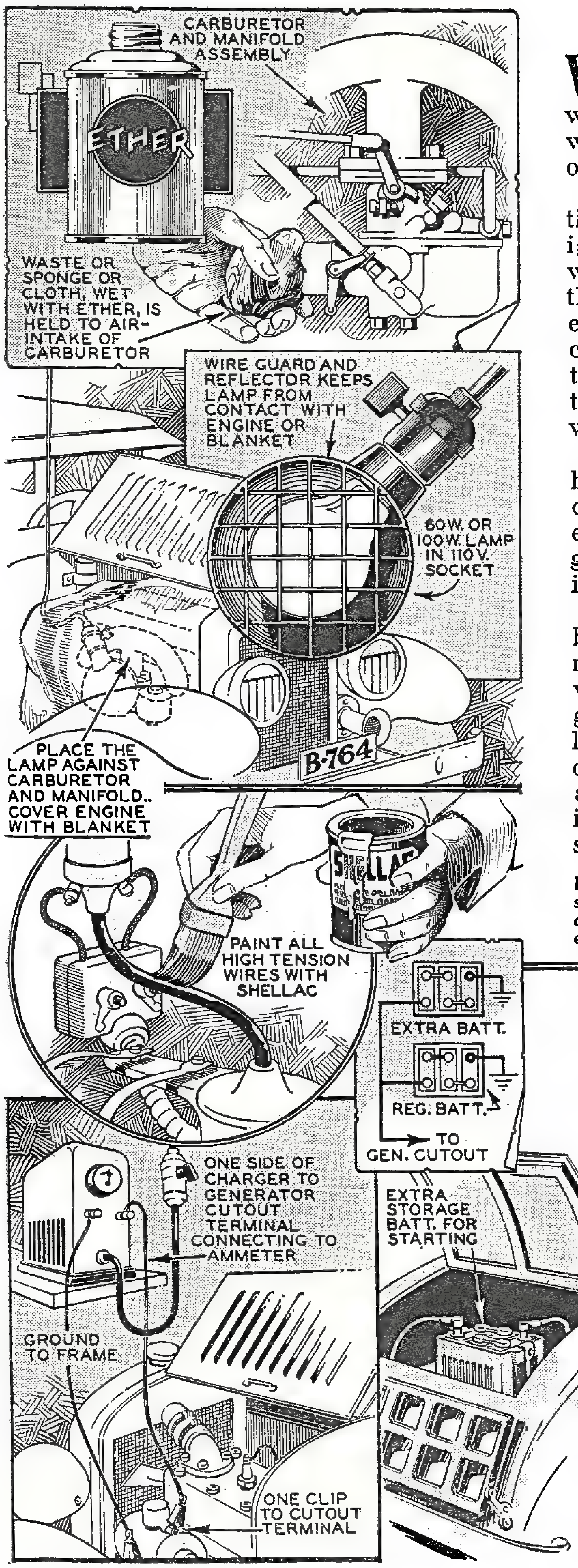
by **L. J. MARKUS**

WINTER brings a multitude of troubles to the auto owner, the most annoying of which is undoubtedly the starting of a car which has stood outside or in a cold garage overnight.

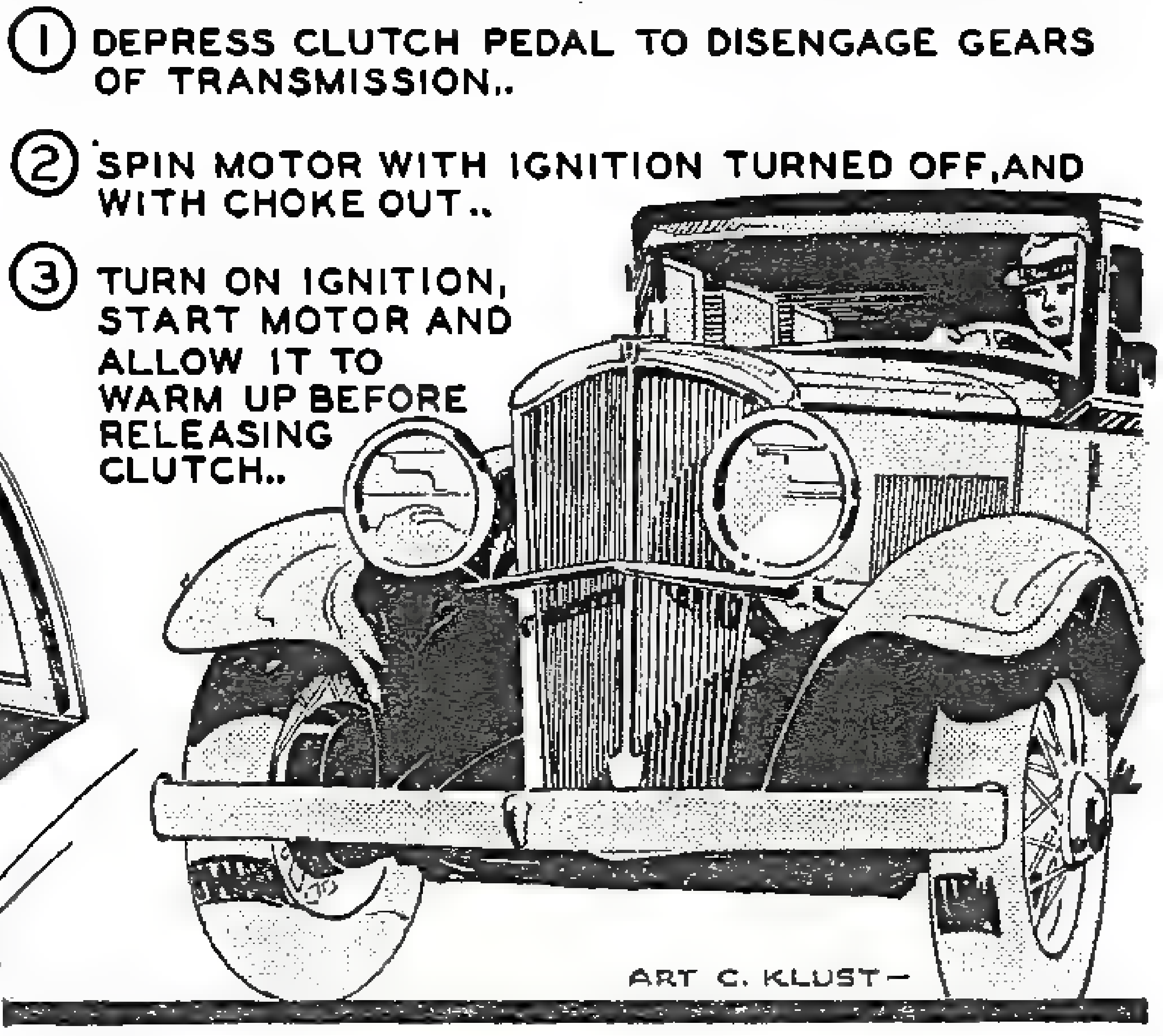
Ether has been injected into the combustion chamber of engines for years to aid in igniting the gasoline. With modern cars, where it is difficult to get liquid ether into the engine, soak a sponge or cloth with ether and hold over the air intake of the carburetor while someone is turning over the engine. The fumes will be drawn through the carburetor into the engine, where they mix with the gasoline.

The old saying about prevention being better than cure very aptly applies to the car. By keeping the engine just warm enough overnight to prevent oil from congealing, there will be no cold-morning starting troubles.

A 100 watt bulb placed against the carburetor and left burning through the night will not consume more than five cents worth of electricity, yet will keep the engine warm. The regular garage extension light with a wire guard is covered over with old blankets or sacks, to keep the heat in as much as possible. Be careful that no inflammable material touches the bulb itself. This method is generally used only


CARBURETOR AND MANIFOLD ASSEMBLY
ETHER
WASTE OR SPONGE OR CLOTH, WET WITH ETHER, IS HELD TO AIR-INTAKE OF CARBURETOR
WIRE GUARD AND REFLECTOR KEEPS LAMP FROM CONTACT WITH ENGINE OR BLANKET
60W. OR 100W. LAMP IN 110V. SOCKET
B-764
PLACE THE LAMP AGAINST CARBURETOR AND MANIFOLD.. COVER ENGINE WITH BLANKET
SHELLAC
PAINT ALL HIGH TENSION WIRES WITH SHELLAC
EXTRA BATT.
REG. BATT.
TO GEN. CUTOUT
ONE SIDE OF CHARGER TO GENERATOR CUTOUT TERMINAL CONNECTING TO AMMETER
EXTRA STORAGE BATT. FOR STARTING
GROUND TO FRAME
ONE CLIP TO CUTOUT TERMINAL

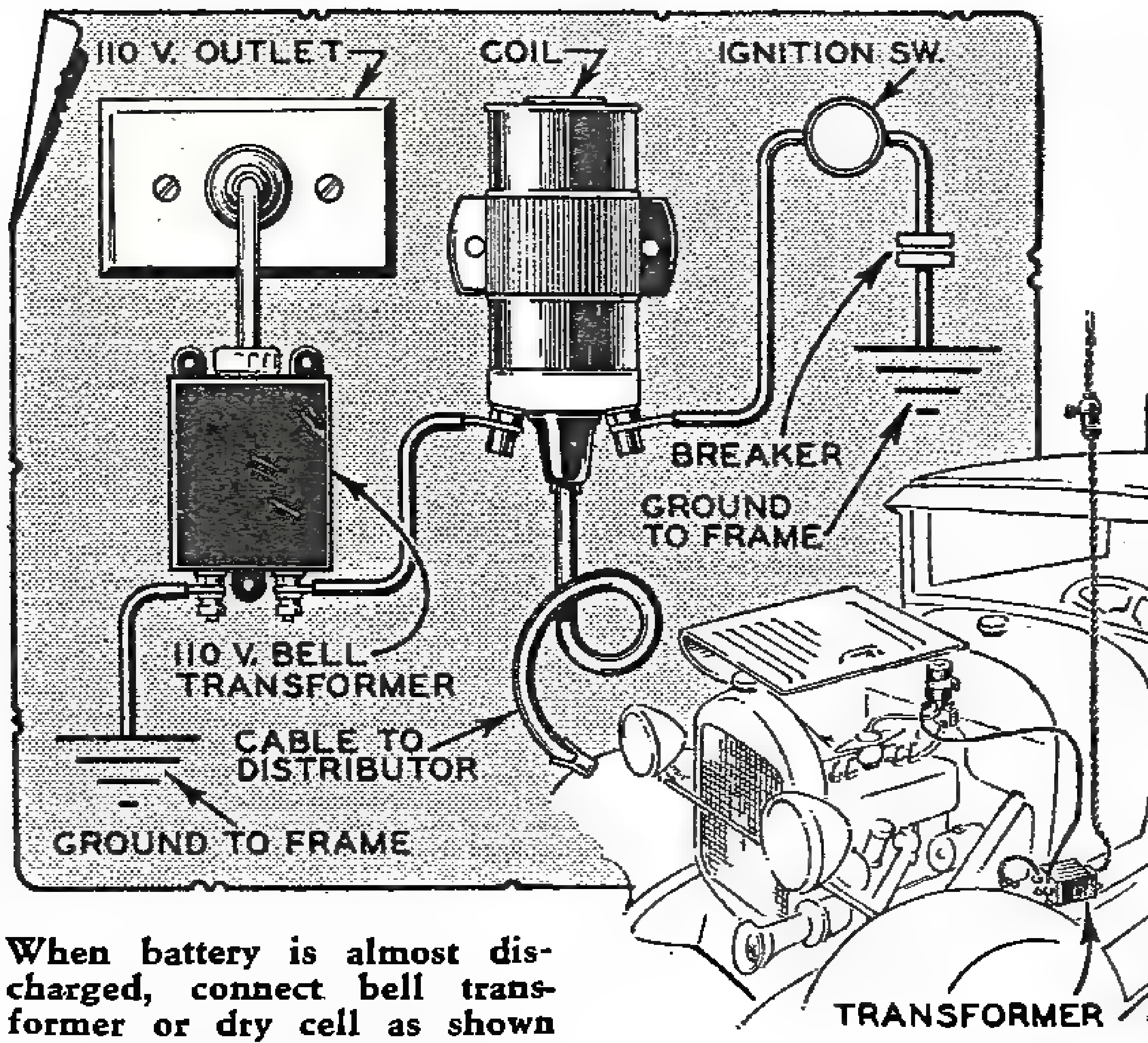
Ether-soaked rag held near the carburetor intake makes starting of cold engine easier. To keep engine warm during cold nights, place electric bulb near carburetor, then cover engine with blankets. Shellac wires to keep out moisture.


① DEPRESS CLUTCH PEDAL TO DISENGAGE GEARS OF TRANSMISSION..
② SPIN MOTOR WITH IGNITION TURNED OFF, AND WITH CHOKE OUT..
③ TURN ON IGNITION, START MOTOR AND ALLOW IT TO WARM UP BEFORE RELEASING CLUTCH..
ART C. KLUST—

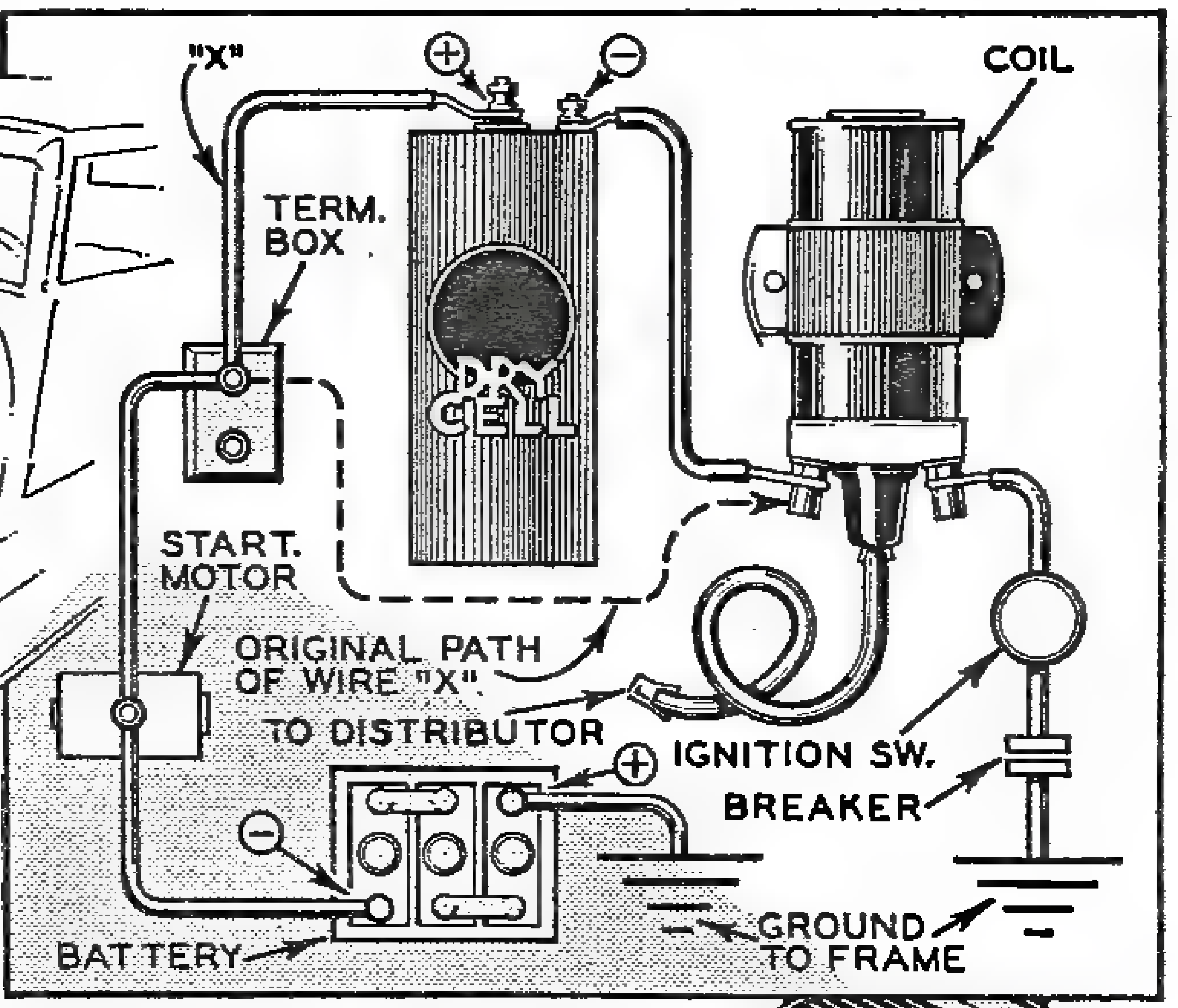
Radio trickle charger connected to car as shown will keep battery in good condition for winter driving. Extra storage battery in parallel with car battery will spin starter faster. Strap extra battery down securely. Cold-weather starting procedure for autos is indicated above.

in BELOW-ZERO Weather

Below-zero temperatures reduce the power of your car battery and at the same time make the engine far harder to start. Try these kinks the next time your engine is too cold and stiff to start.


110 V. OUTLET
COIL
IGNITION SW.
BREAKER
GROUND TO FRAME
110 V. BELL TRANSFORMER
CABLE TO DISTRIBUTOR
GROUND TO FRAME
TRANSFORMER

When battery is almost discharged, connect bell transformer or dry cell as shown above to get the car started.


"X"
COIL
TERM. BOX
DRY CELL
START. MOTOR
ORIGINAL PATH OF WIRE "X"
TO DISTRIBUTOR
IGNITION SW.
BREAKER
BATTERY
GROUND TO FRAME

when the temperature gets down to around 20° below.

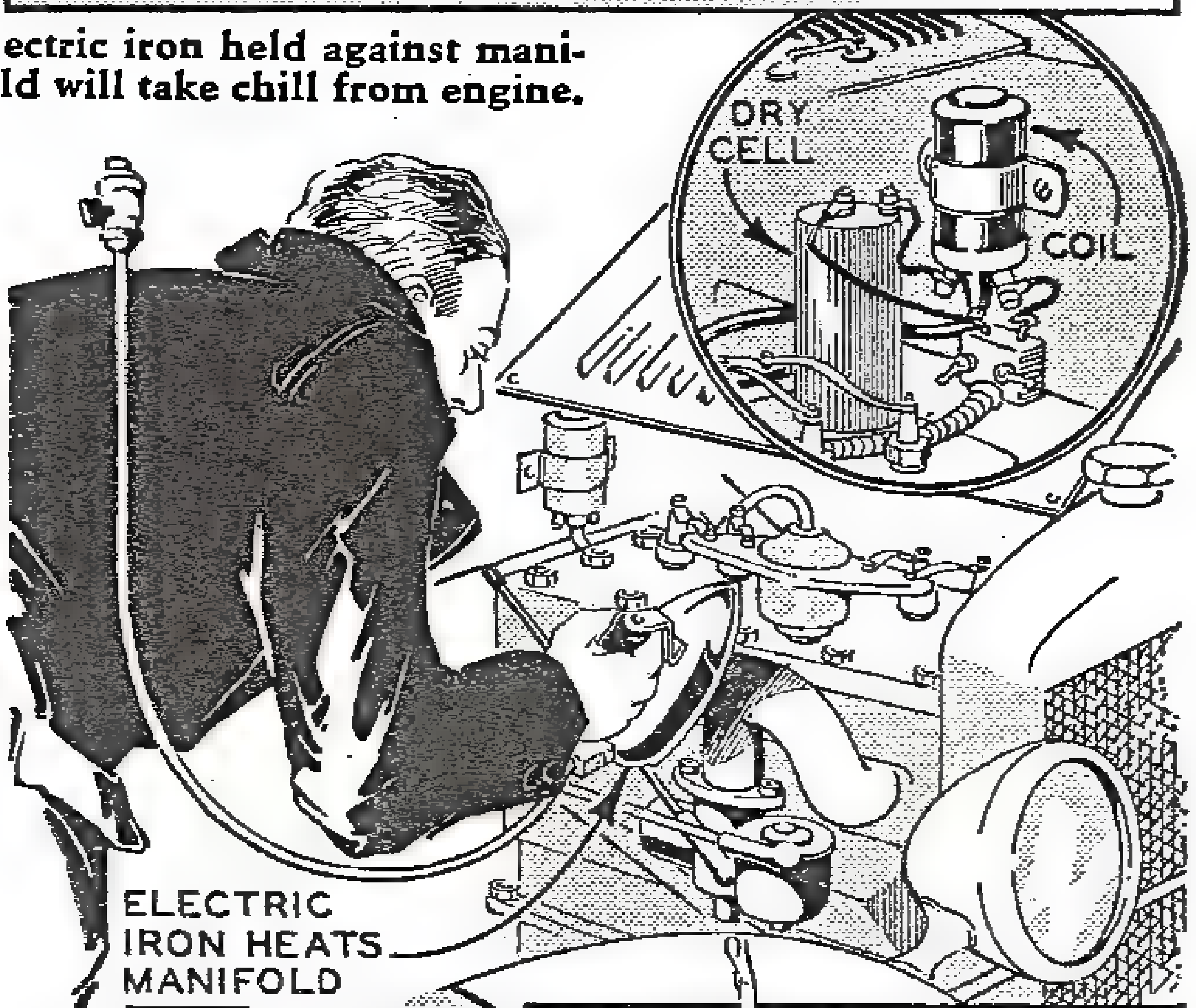
Snow seeping in over the engine will often cause leakage of current from the high tension wires. This can be prevented by shellacking all ignition wires, making them doubly waterproof.

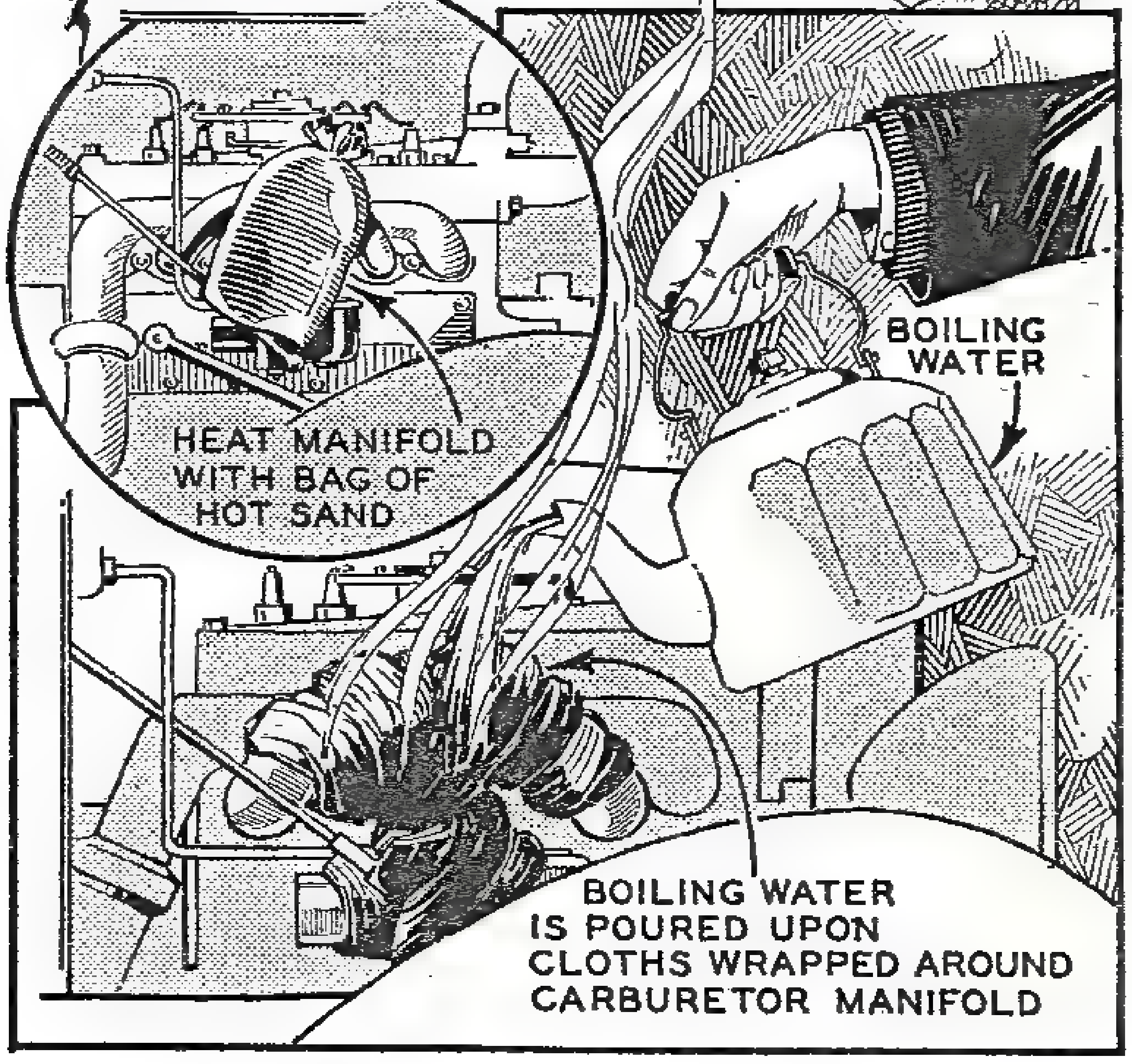
Even with the generator charging rate set at the maximum, it will be impossible on some cars to keep the battery fully charged in winter. A radio trickle charger connected to the car battery each night will save many a trip to the battery service station. Attach spring clips to each lead, snapping one to the frame of the car, the other to the cutout terminal. Polarity is correct when the ammeter shows "charge" as the charger is switched on.

Where an engine is unusually hard to start, or where a car is left out on the street all day, an extra storage battery is recommended. Strap this down somewhere in the back of the car, and make connections with regular starter cable. If the negative of your battery is grounded, one cable should go from the negative of the extra battery to the frame of the car, the other to the positive of the regular battery. In connecting "hot" leads together, scrape off insulation for a few inches, wrap bare copper wire over the two leads, and apply solder freely to the joint, using acid if necessary to clean the copper. With this parallel connection both batteries will be charged at the same time by the auto generator.

(Cont'd on page 126)

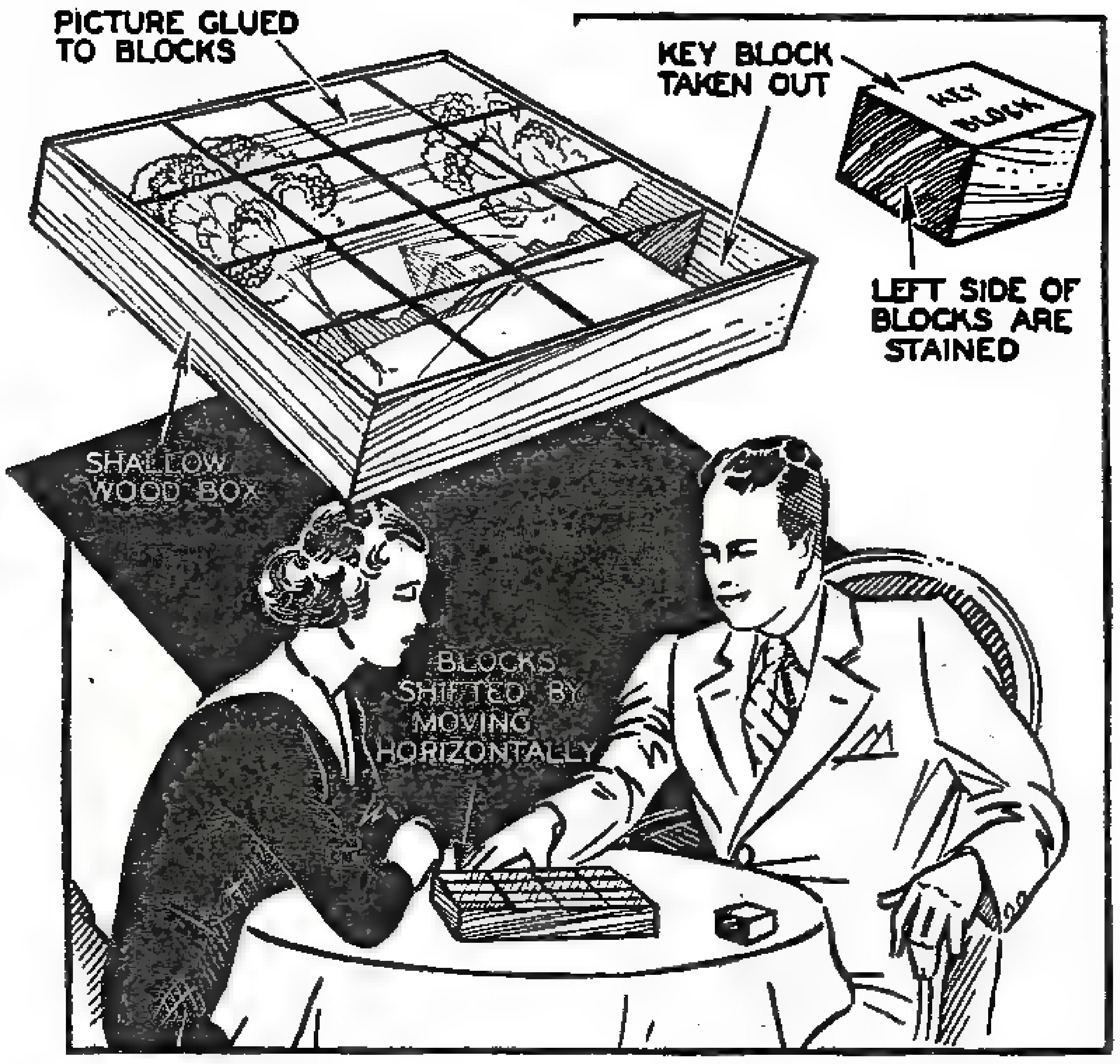
Electric iron held against manifold will take chill from engine.


DRY CELL
COIL
ELECTRIC IRON HEATS MANIFOLD


BOILING WATER
HEAT MANIFOLD WITH BAG OF HOT SAND
BOILING WATER IS POURED UPON CLOTHS WRAPPED AROUND CARBURETOR MANIFOLD

Bag of hot sand placed over carburetor, manifold warms up engine. Quicker results are obtained by wrapping rags around carburetor and manifold, then pouring on boiling water. With carburetor warm, fuel vaporizes more easily.

Scrambled Pictures Add Zest to Old Fifteen Block Puzzle


PICTURE GLUED TO BLOCKS
KEY BLOCK TAKEN OUT
KEY BLOCK
LEFT SIDE OF BLOCKS ARE STAINED
SHALLOW WOOD BOX
BLOCKS SHIFTED BY MOVING HORIZONTALLY

In novel variation of 15 block puzzle, picture glued to blocks is scrambled, then blocks shifted to form it again. Stain one side of blocks to facilitate replacing in box.

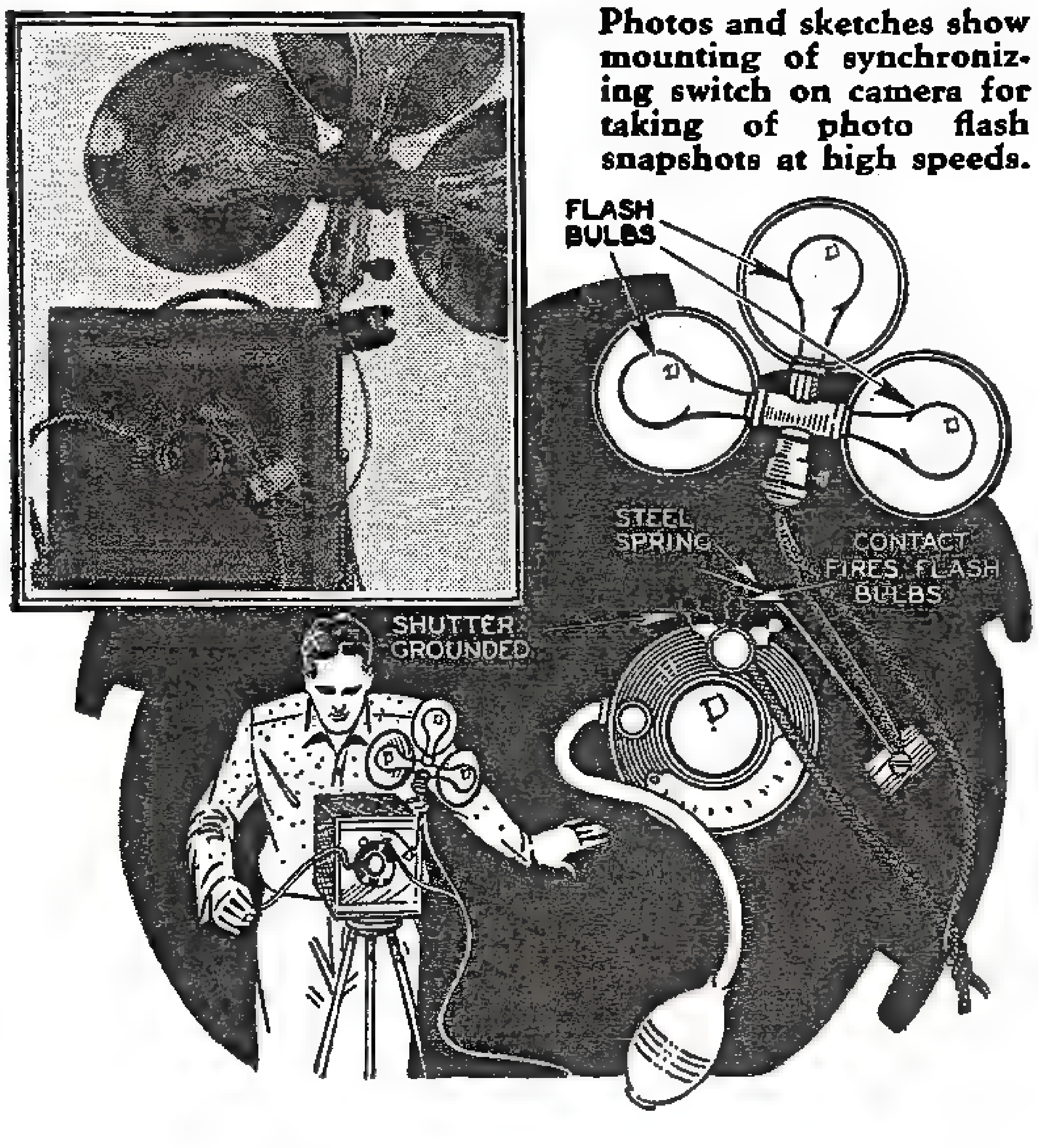
COMBINING the good points of the fifteen block puzzle so popular a generation back with the jig saw puzzles of a few years ago, scrambled pictures provide absorbing entertainment guaranteed to while away many a long winter evening.

To construct this puzzle, make a shallow box which will hold either 16, 25, or 36 square blocks of wood. Select a colored picture having sharply defined details, and trim down to the size of your box. Glue the picture over the blocks, then cut it apart with a razor blade. Scramble the blocks, remove the key block, and begin.

Snapshots With Photo Flash Bulbs

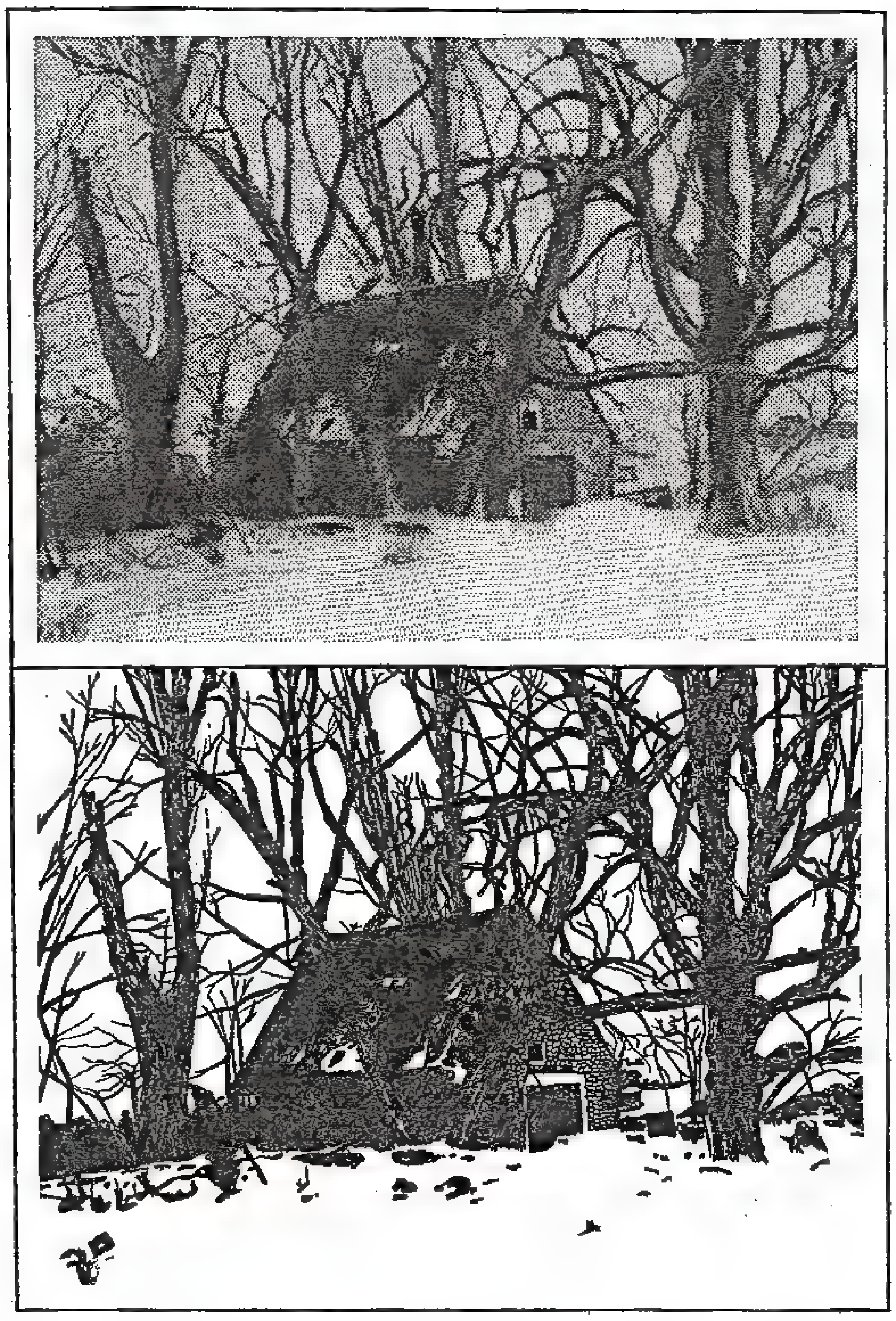
SNAPSHOTS taken with a speed as fast as 1/300th of a second have been made with this simple mechanism for synchronizing photo flash bulbs with the camera shutter. The method can be applied to all cameras having a setting lever for snapshots.

One of the leads which would normally go to the photo flash switch is grounded to the shutter frame, the other connected to a steel spring mounted on an insulating block near the shutter. This spring is so adjusted that the setting lever will make contact with it at the instant the shutter is opened. This closes the circuit to the photo flash bulb, setting it off.



Photos and sketches show mounting of synchronizing switch on camera for taking of photo flash snapshots at high speeds.

Making Pen Sketches From Photos



Original photograph is shown above; below is pen sketch made by tracing over photograph with water-proof India ink, then bleaching out image with chemicals. Sketch is rinsed in cold water, placed for 10 min. in bath of 2 oz. hypo, 8 oz. water, then rinsed for ½ hr. in running water.

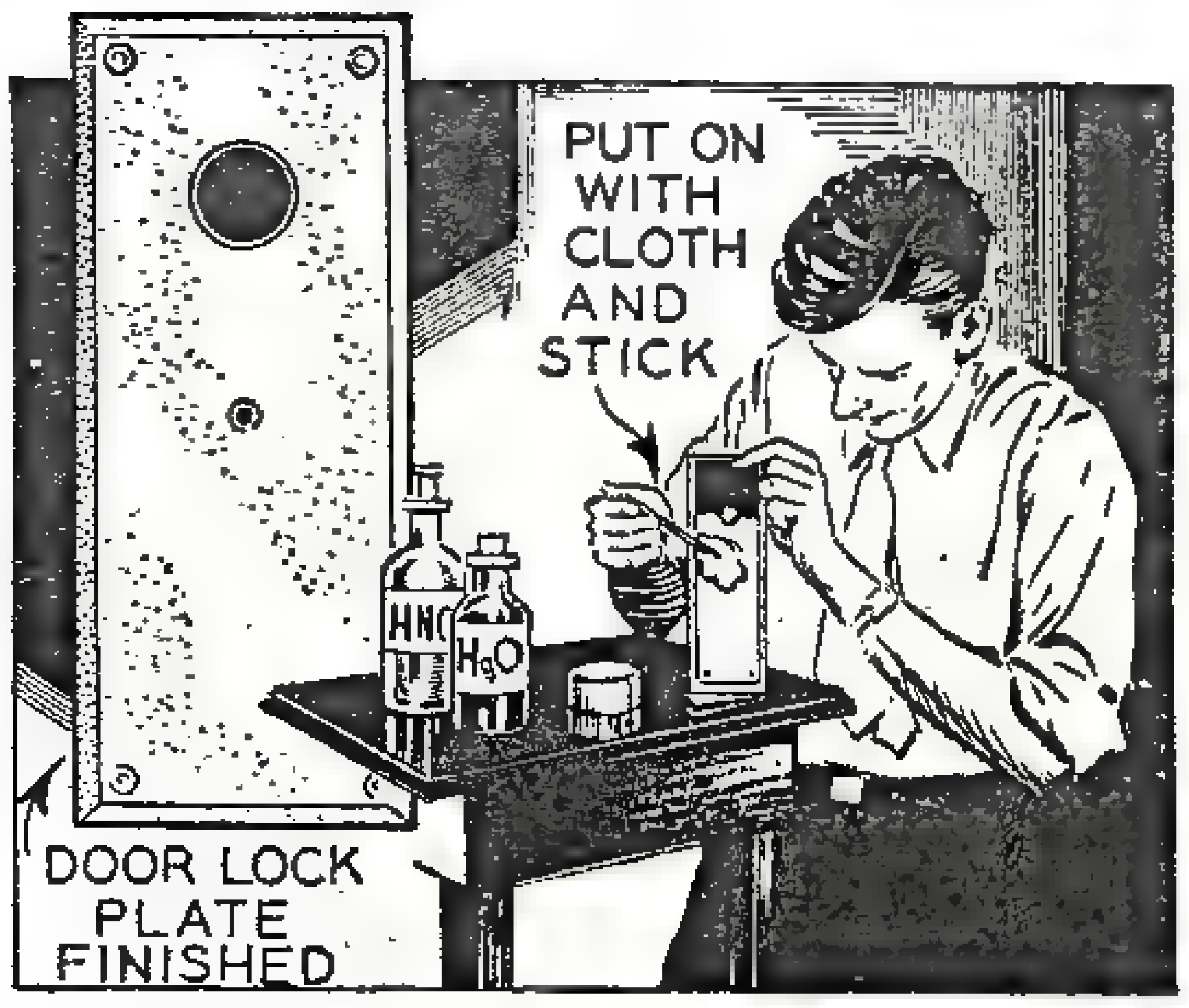
PEN and ink sketches can be made directly from photographs. After making a light-toned enlargement from the selected negative, trace over with waterproof India ink the parts of the photograph which are to appear in the finished sketch.

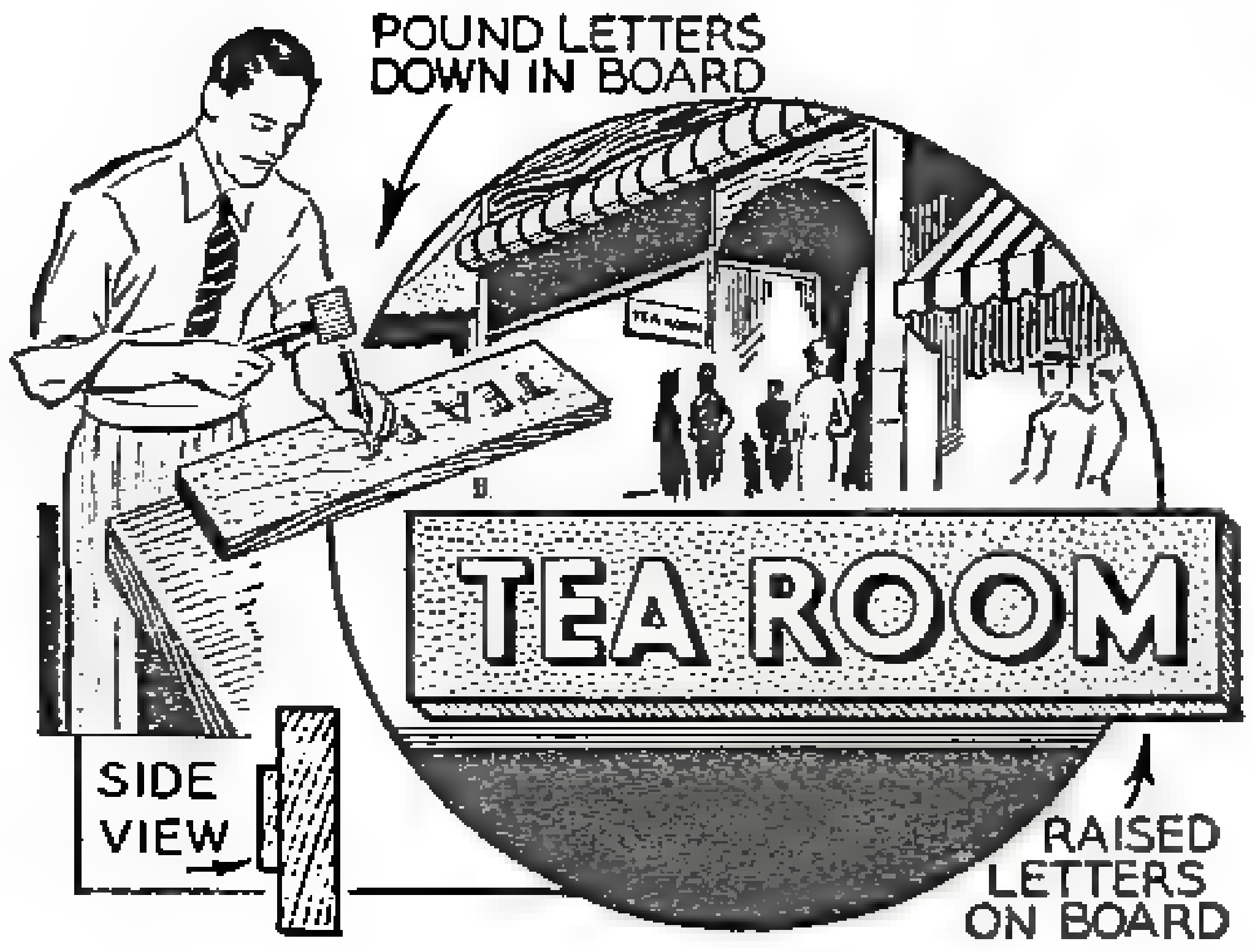
After the ink has dried, place the print face up in a tray containing one ounce of copper sulphate ground to a fine powder and dissolved in enough warm water to make a dark blue solution. Add small quantities of table salt to speed up bleaching.

PAINTING AND GLUING SECRETS

Chromium Like Plate Easily Applied

A CHROMIUM like finish on copper or brass is applied by this method just as easily as is a paint finish. Place a pinch of red mercury oxide in a small porcelain dish and pour in a few drops of 50% nitric acid. Stir, then apply to the metal with a small piece of cloth tied to a wood splinter. Cleaning of the metal usually is not necessary, since the nitric acid removes dirt and grease stains. Paint should first be removed with steel wool. The fluid works in almost magical manner, a small quantity being sufficient.—Kurt Borm.


PUT ON WITH CLOTH AND STICK
HNO_3
H_2O
DOOR LOCK PLATE FINISHED


POUND LETTERS DOWN IN BOARD
TEA ROOM
SIDE VIEW
RAISED LETTERS ON BOARD

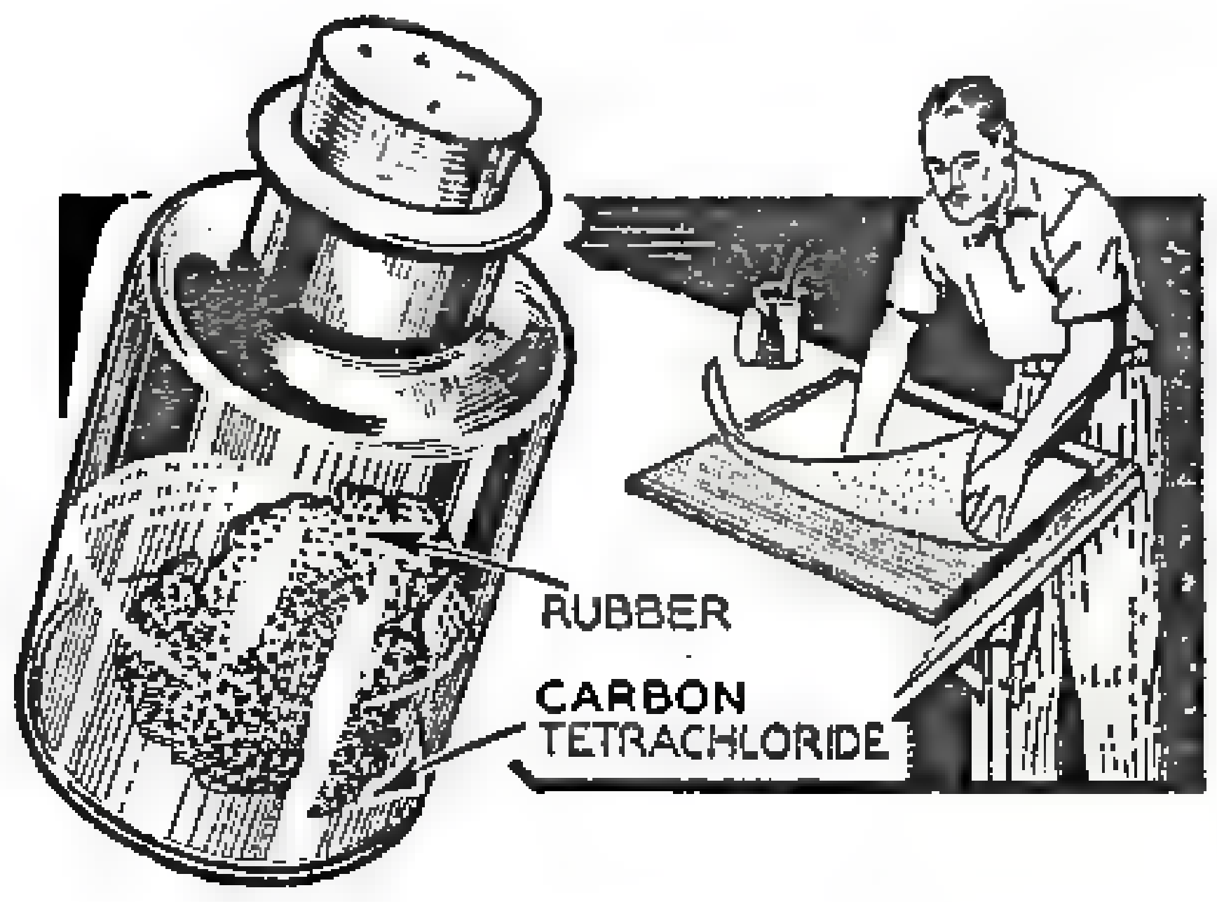
Raised-Letter Signs Easily Made From Wood

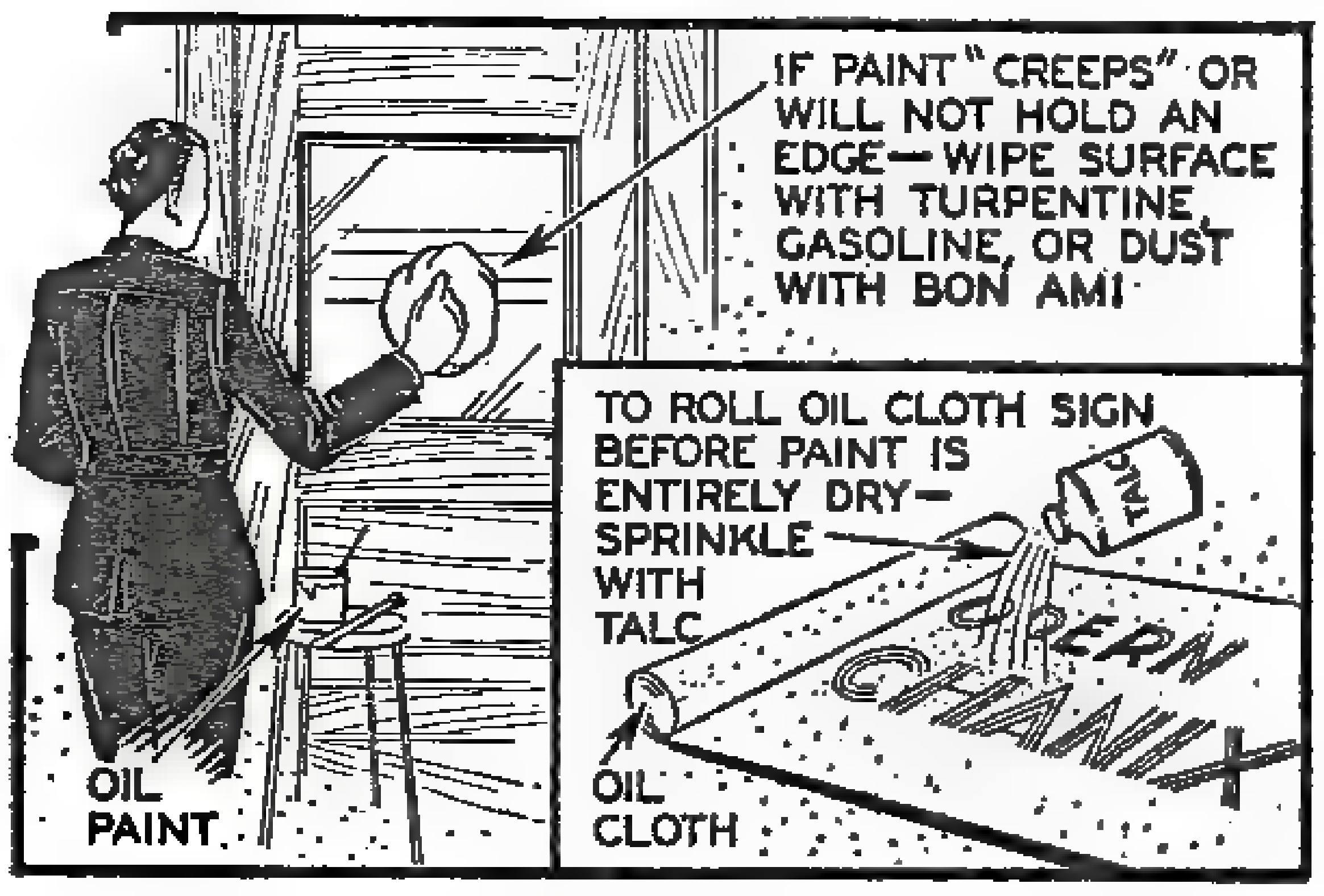
PLEASING raised-letter signs can be made without any hand carving by this simple but ingenious method. Lay out the desired lettering on a piece of soft pine board. Using a nail set, punch the letters down to about ¼" below the surface. Plane the wood down until a light cut has been taken from the tops of the letters, then soak the sign for around six hours to bring the letters back to their original height. A coat or two of paint finishes the job.—Herbert Arral.

Make Own Rubber Cement for Mounting Photos

THOUGH artists have been using rubber cement for years, it has only recently come into widespread general use. Stamp collectors, finding that a dab of cement near the corner of each stamp will hold it down firmly yet permit removal with no damage, are using the cement in place of stamp hinges. Amateur photographers find the cement ideal for mounting photographs, since it does not cause wrinkles.

To make your own cement, place an ounce or so of pure or grey rubber in a wide mouth bottle. Pour enough carbon tetrachloride into the bottle to cover the rubber, then cork tightly and allow to stand for a few days in a warm place. After the rubber has completely dissolved, thin out the cement if necessary by adding more solution, or thicken it by exposure to air. Since the carbon tetrachloride readily evaporates, keep your cement bottle tightly stoppered when not in use. Apply the cement with a small brush to both surfaces.—Chemcraft Chemist.


RUBBER
CARBON TETRACHLORIDE

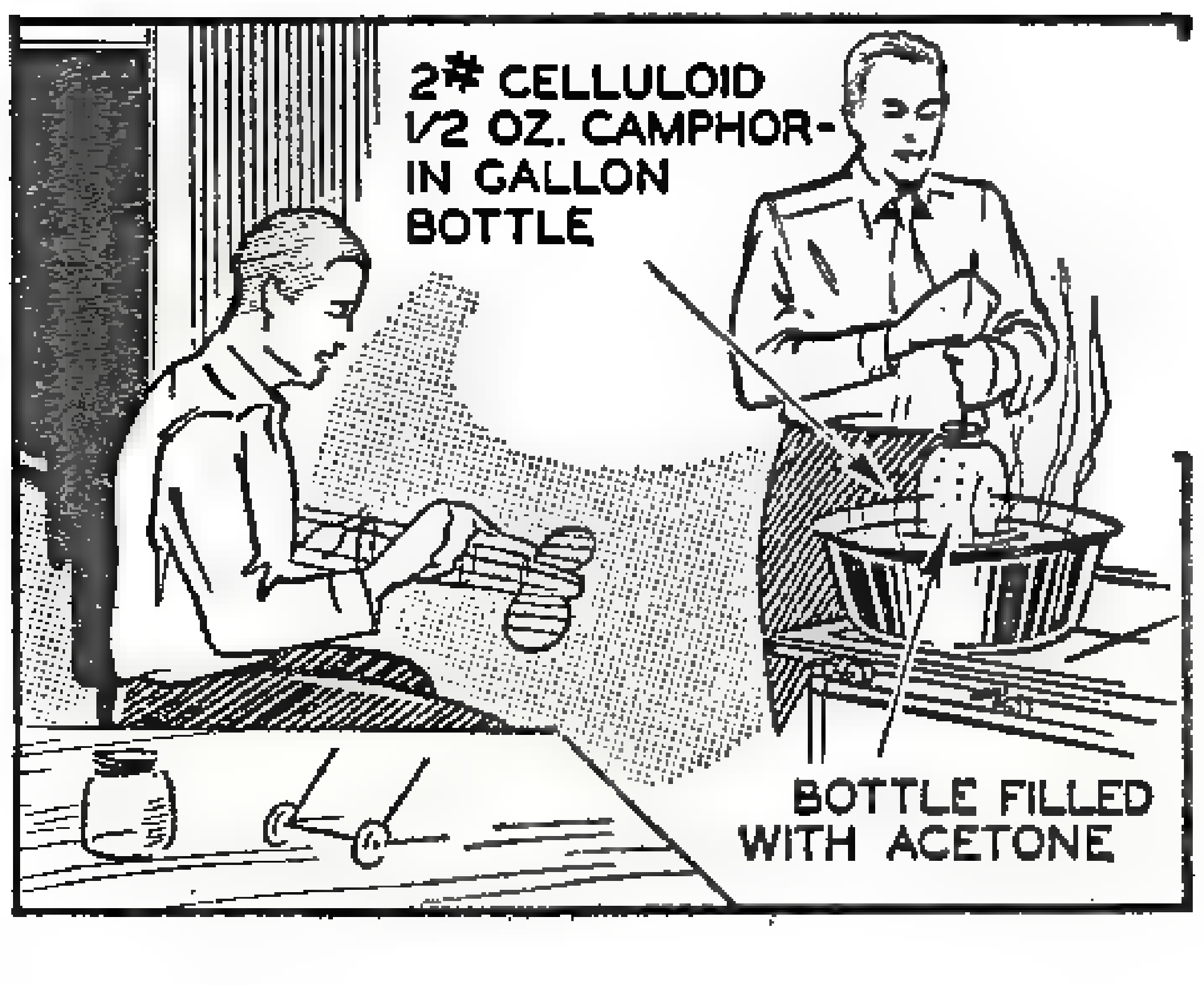

IF PAINT "CREEPS" OR WILL NOT HOLD AN EDGE—WIPE SURFACE WITH TURPENTINE, GASOLINE, OR DUST WITH BON AMI
TO ROLL OIL CLOTH SIGN BEFORE PAINT IS ENTIRELY DRY—SPRINKLE WITH TALC
TALC
OIL PAINT
OIL CLOTH

Powder Stops Oil Paints From Creeping

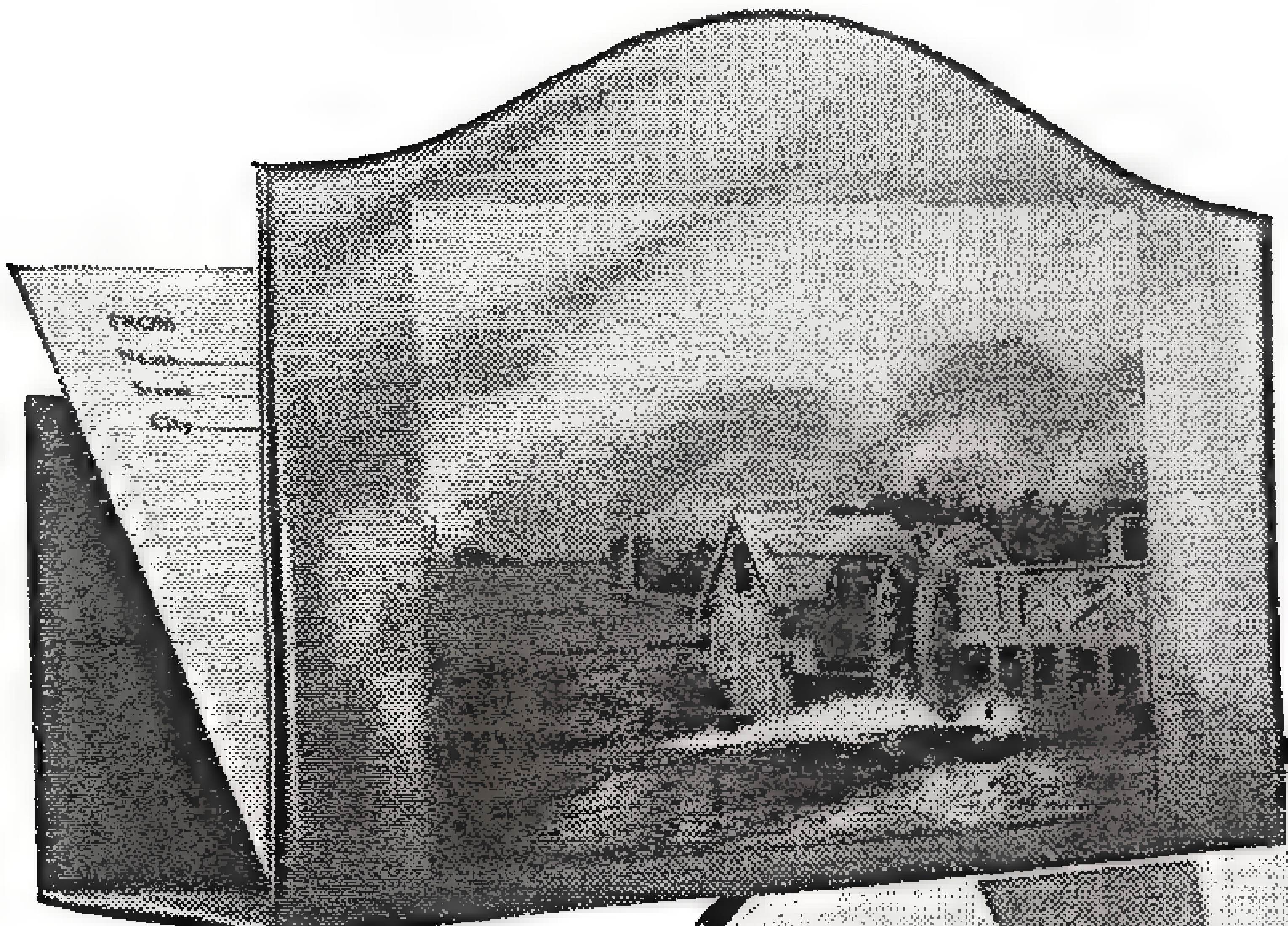
WHEN painting or lettering with oil colors upon glossy or oily surfaces, the paint sometimes creeps. If a wiping with turpentine or gasoline does not help, the trouble can be overcome by dusting on powdered Bon-Ami. Rub off surplus powder with a clean piece of cheesecloth. To roll up oilcloth signs before the paint has completely dried, dust with talcum powder or Bon Ami.—Leslie Nagg.

Waterproof Glue Made From Scrap Celluloid

A WATERPROOF glue ideal for model airplane and model boat construction work can be made up at little cost from scrap celluloid. Place two pounds of scrap celluloid in a wide-mouth gallon jar, then add a half-ounce of camphor and fill the jar with commercial acetone. Allow the mixture to stand for an hour, then stir with a stick. By the next day you should be able to stir the glue into a homogeneous mass.—E. F. Waldron.


2# CELLULOID 1/2 OZ. CAMPHOR—IN GALLON BOTTLE
BOTTLE FILLED WITH ACETONE

Print Photographs in COLOR



Finished envelope holder having photographic view of old waterwheel printed in color on burnished copper surface is shown above. Personal photos or scenic views can be printed directly from negative upon metal, glass, wood, or any other smooth, light-colored surface by process described in text. Fig. 2—A strip of copper 1/4" wide all around design is pounded down over hardwood form with wood mallet, working carefully to avoid wrinkles in any one spot.

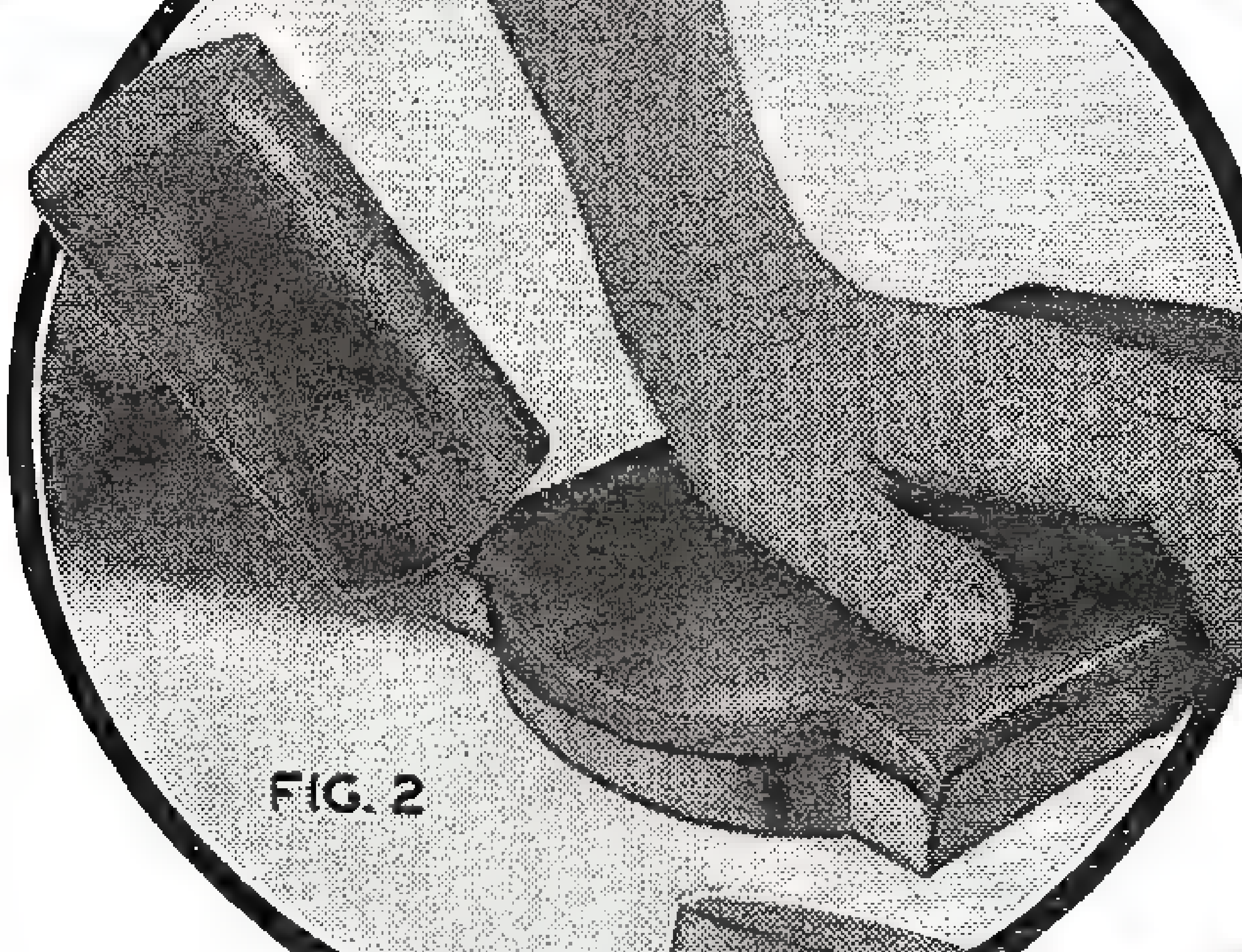


FIG. 2

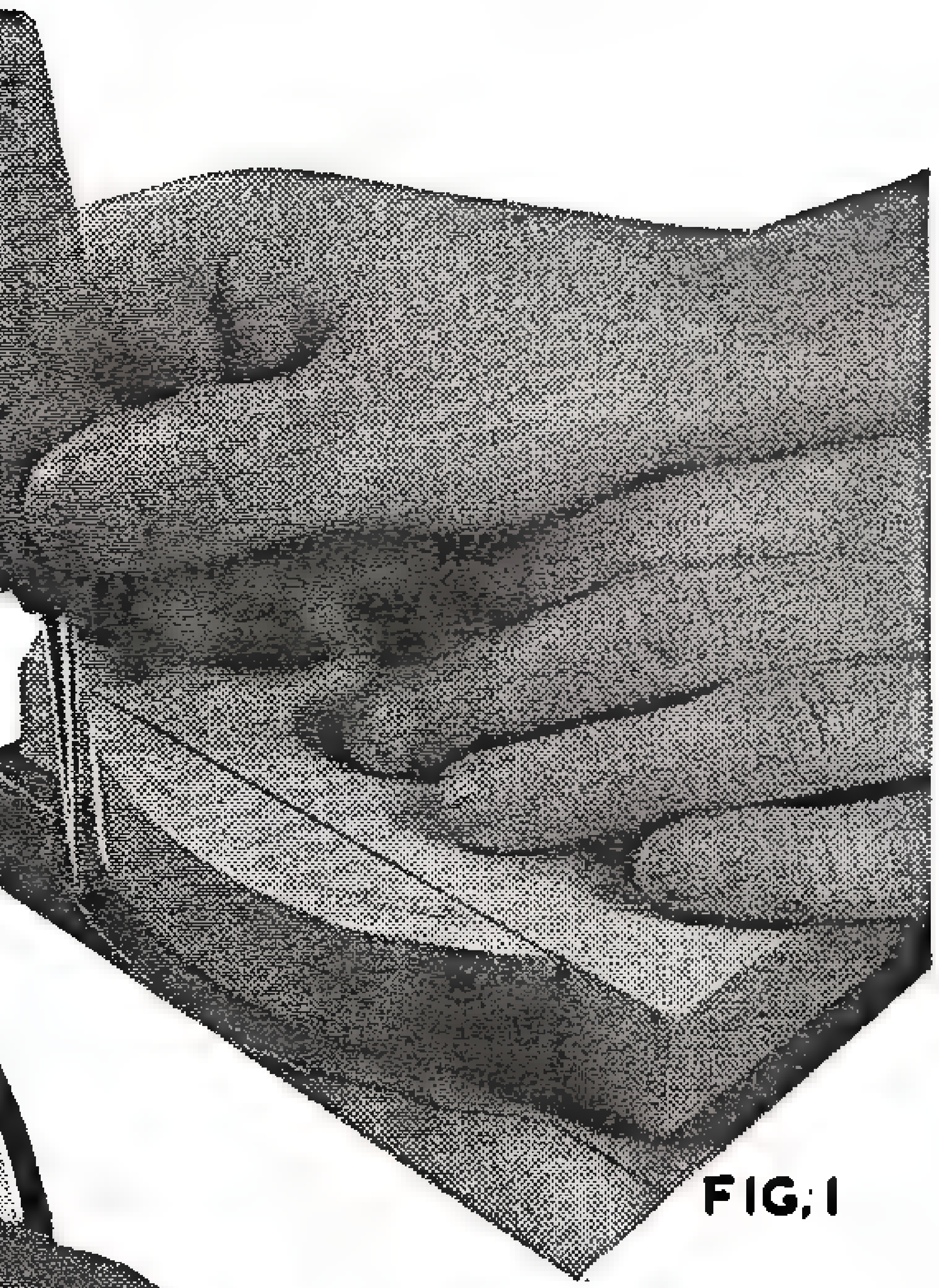


FIG. 1

Fig. 1.—Design for letter holder is first cut out from hardwood form. Sheet of copper is marked for cutting so that it will be 1/4" larger, on all sides, than wood form. Trim off surplus copper with tin snips, then file smooth.

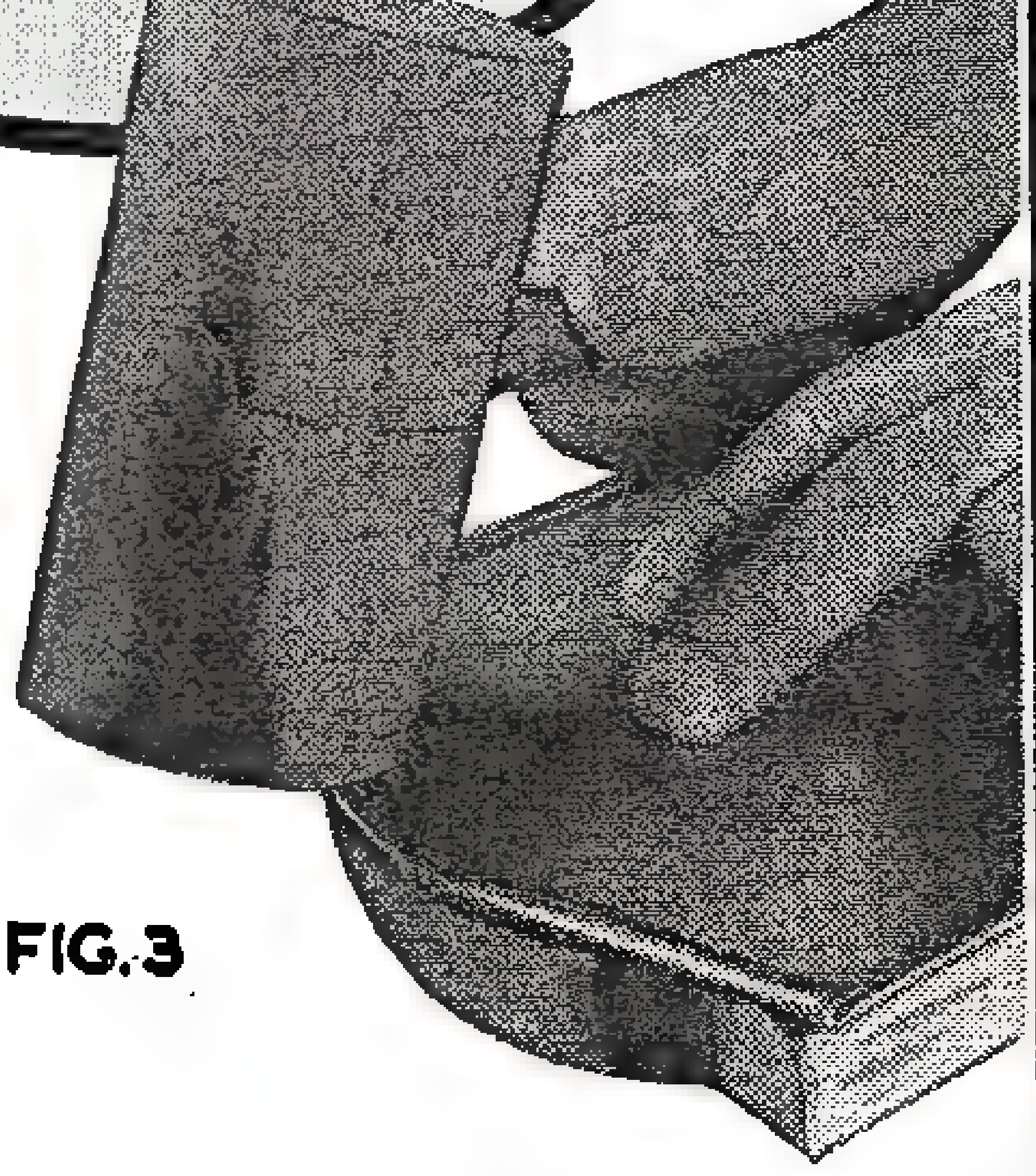


FIG. 3

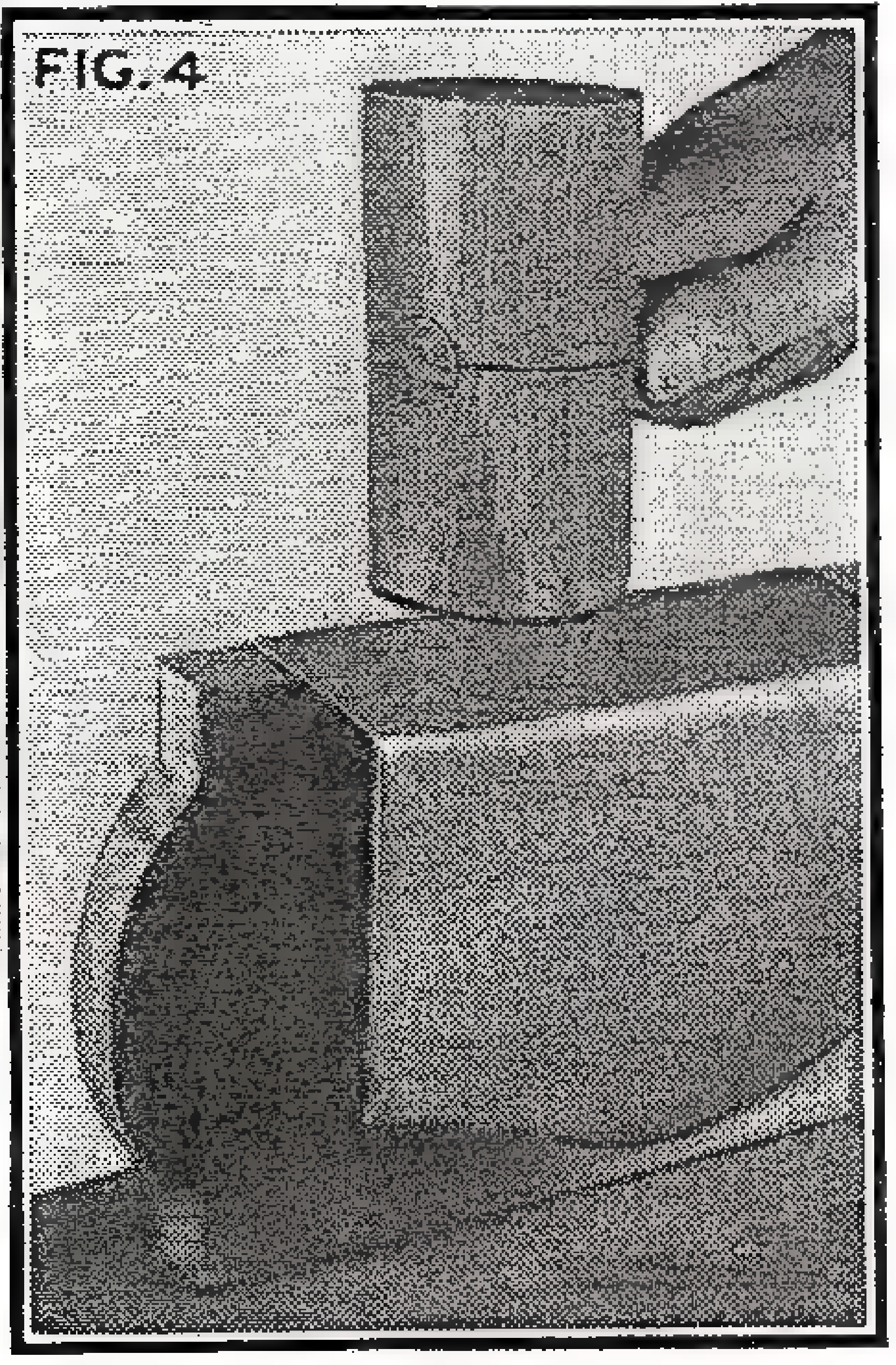


FIG. 4

Fig. 3.—Copper edge is hammered back on itself, working carefully to avoid wrinkles on curved portion. Fig. 4—With edges re-inforced, copper is bent into shape of "U".

YOU can inject a personal note into your Christmas gifts this year by placing on them photographs of yourself, of friends or of scenes you have snapped with your camera. Any smooth surface can be treated in this way, including metal, wood, glass or composition. The pictures are permanent, can be made in any color, and have the shiny, glass-like appearance of glazed enamel.

As an example of a home shop project easily treated by this process, the construction of a copper envelope holder, an always-appreciated gift, will be explained. Secure a piece of 6 in. by 10 in. sheet copper of about No. 16 gauge from a plumbing shop. Make sure that it has no dents or scratches. A shaping form is made of 1 in. wood, 5½ in. wide and with one end cut in a curve or design. Mark the copper, at both ends, with the same design, but allow ¼ in. on the edges for turning over. Round all sharp corners of the wood form. Then, with a wood mallet pound down the edges of the copper. Turn the sheet over and pound the edges back down on themselves carefully, using light taps to avoid buckling. This reinforces the sheet so that it will be rigid when it is bent into a "U" shape. Allow 2½ in. for the bottom; one side is 3 in. high, the other 4 in. high.

With fine pumice or some other good abrasive polish the side that is to receive the photograph until it is smooth and glossy. Dry the surface carefully, and see that no bits of lint or other foreign matter which would cause specks in the photograph adhere to it.

You can get small sheets of clear gelatine at the drug store; soak several in cold water

on METAL Gifts

by KENNETH MURRAY

until they are limp. Heat a pan of water; into it place a wide-mouth bottle containing four or five ounces of water. Add just enough of the soaked gelatine to make a solution of the consistency of syrup. This must be filtered twice through a wad of cotton in the neck of a funnel, so that it will be entirely clear and free of lumps and particles. The "sensitizer" is a simple solution of ammonium dichromate. Dissolve as many of the red crystals in an ounce of warm water as possible. Add sufficient of this solution to the liquid gelatine to give the latter a deep orange color.

Coating of the cleaned copper surface is done in a room with a yellow light. The light from an ordinary bulb covered with a thickness of yellow paper will be entirely safe. Flow the orange gelatine solution over the copper surface while the latter is held level in one hand. Drain the excess solution back into the bottle to be used again. Allow the gelatine to drip from one corner of the copper while holding it over a gas or electric stove, letting the copper become

(Continued on page 122)

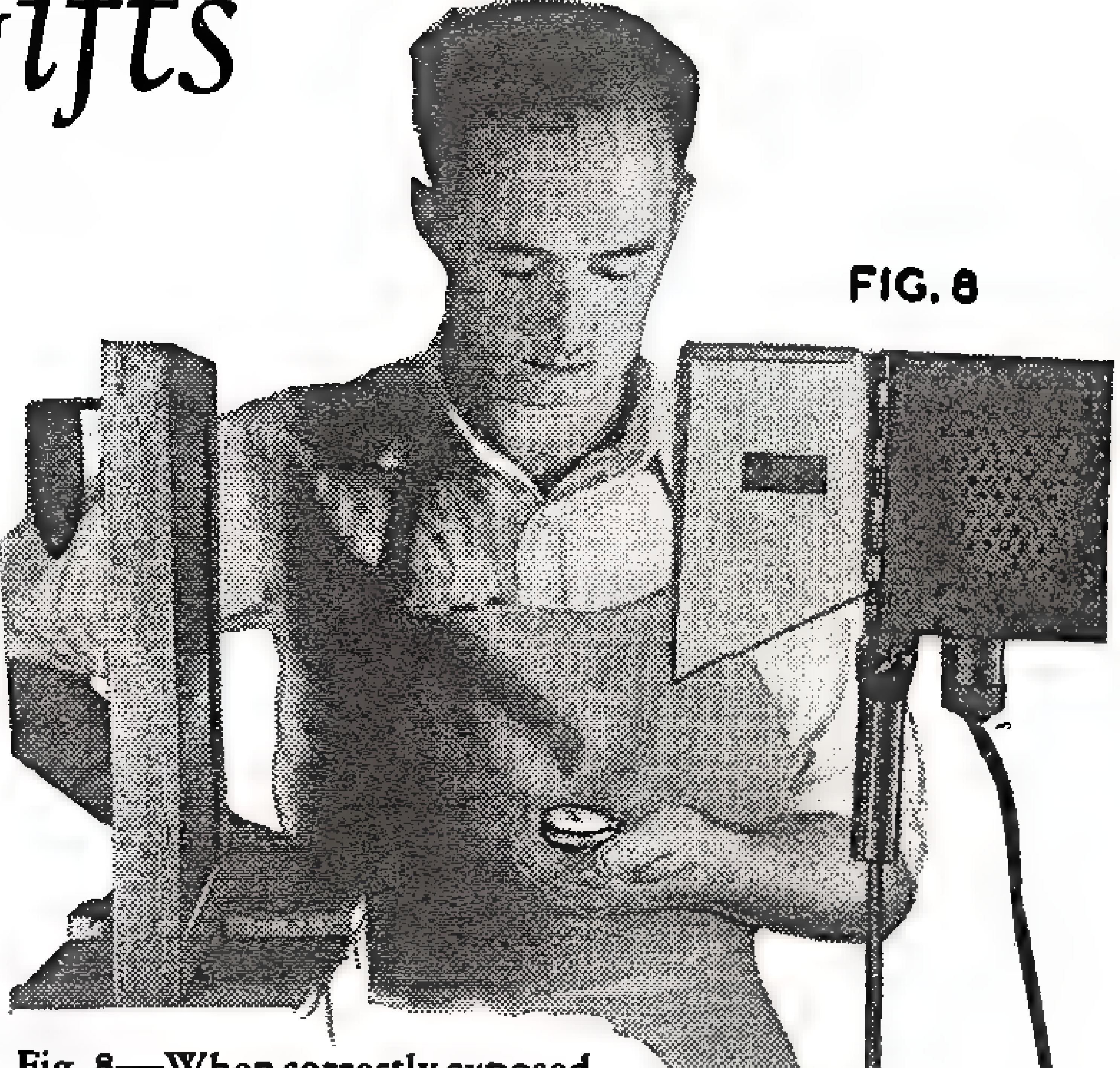


FIG. 8

Fig. 8—When correctly exposed before arc lamp or in sunlight faint brown image will just be visible on copper holder.

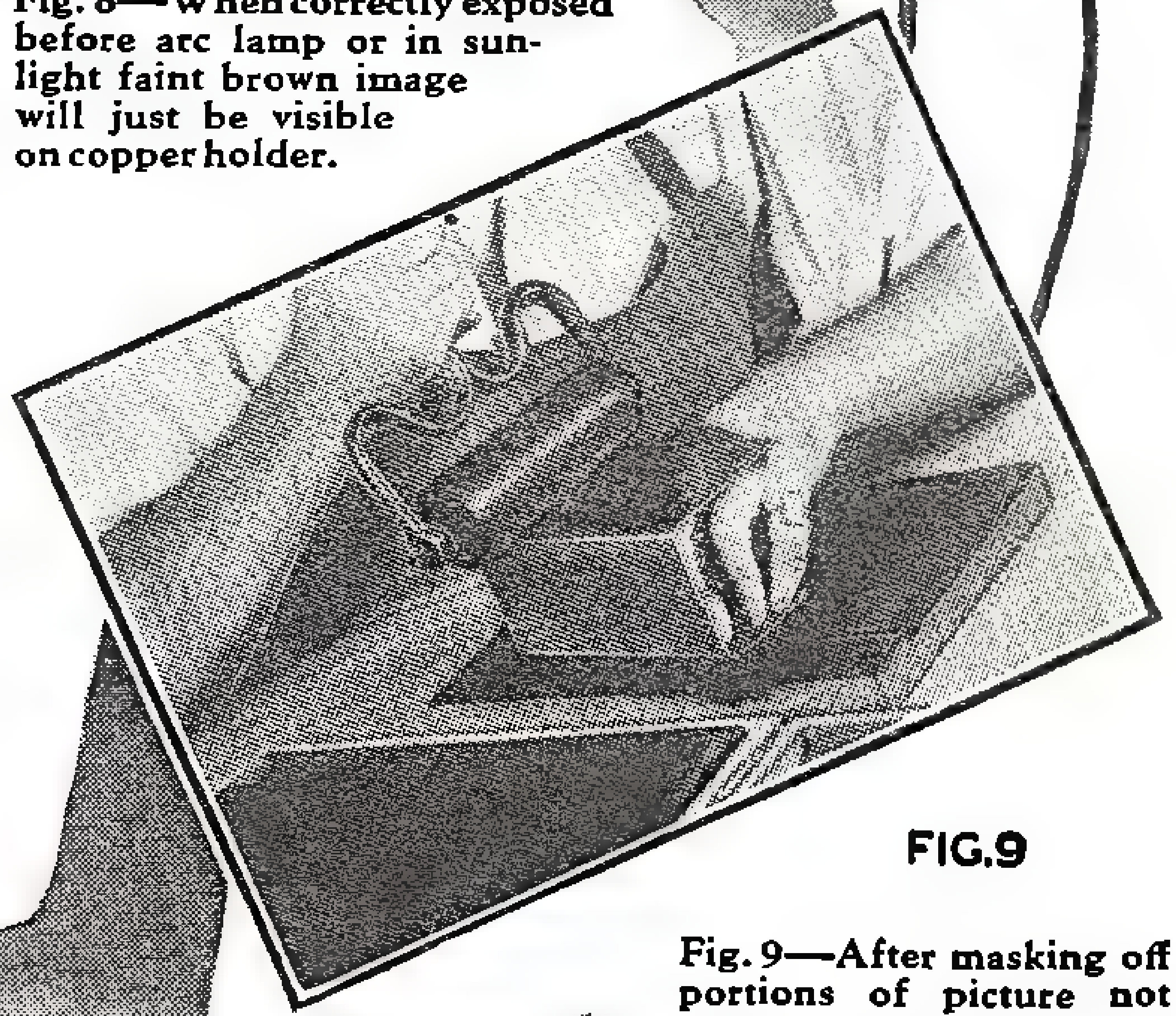


FIG.9

Fig. 9—After masking off portions of picture not needed, copper is "inked up" with ordinary ink roller and selected color of lithograph ink. Repeat inking process until all details of photo show clearly.

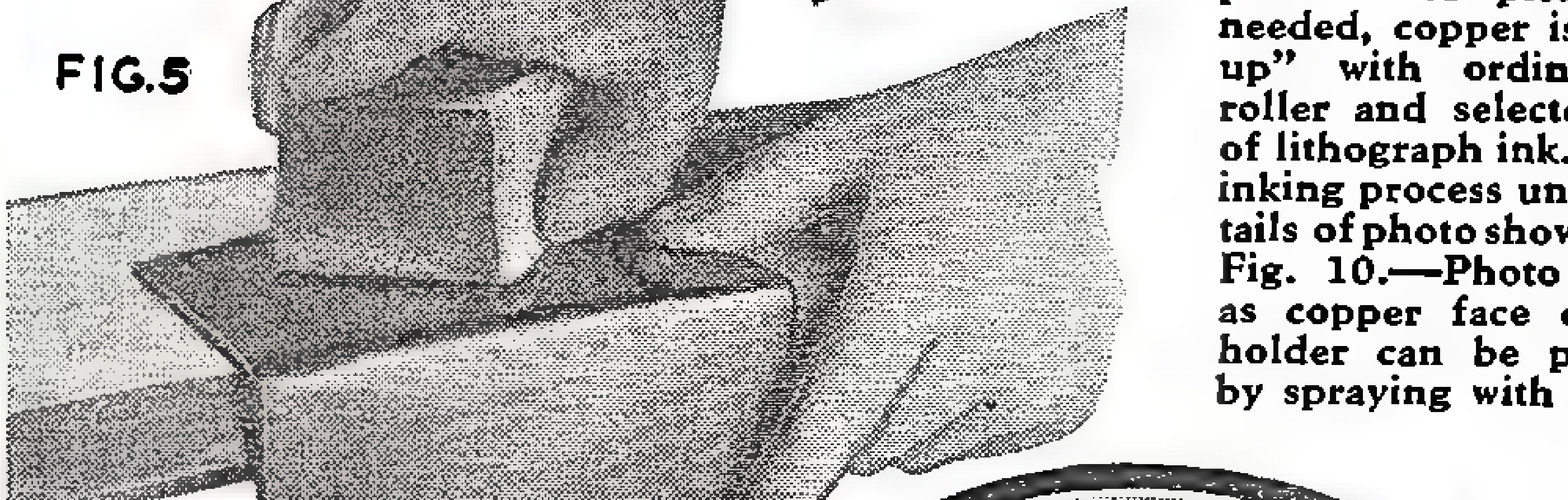


FIG.5

Fig. 5—Polish surface receiving photograph to high gloss, using pumice or other abrasive.

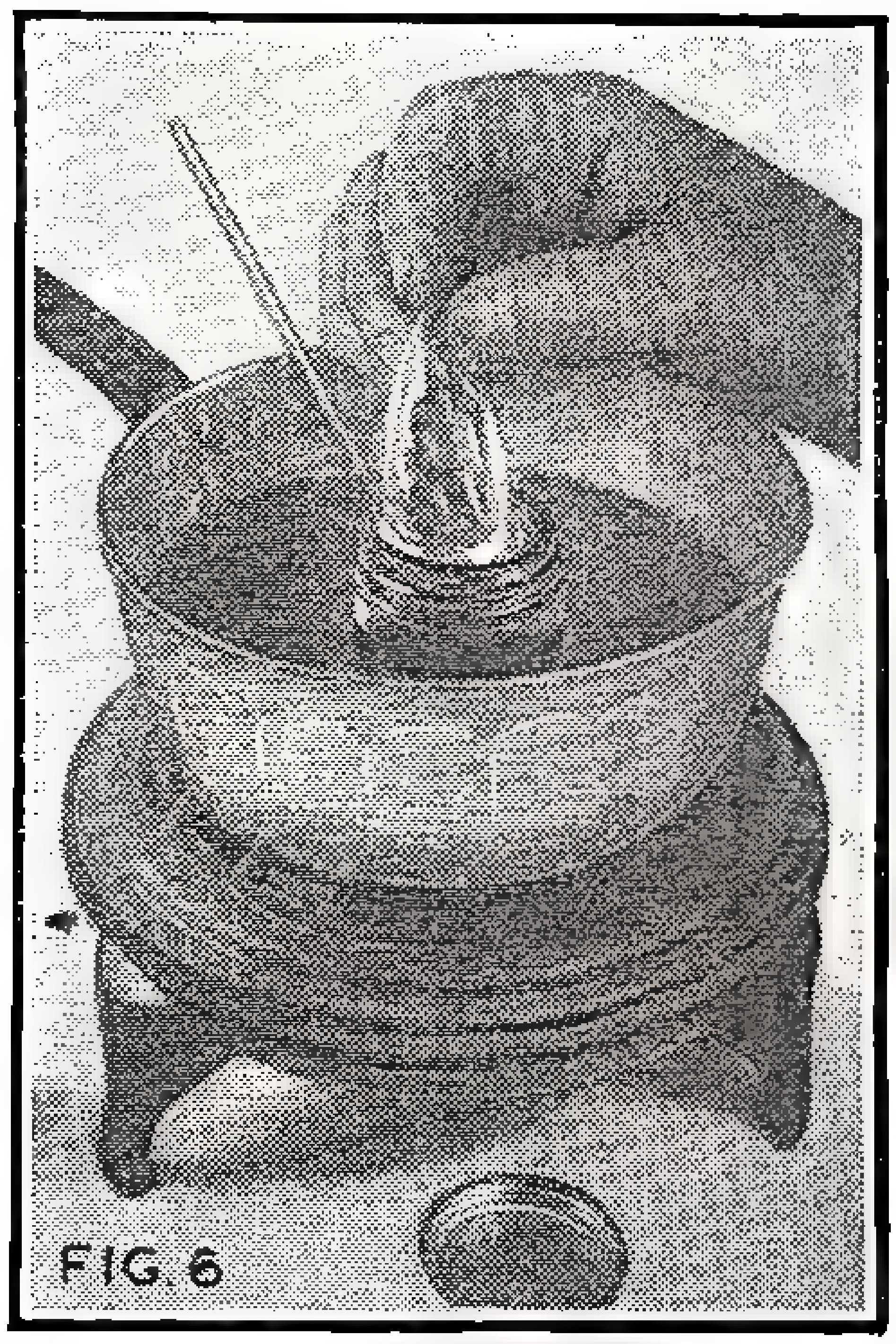


FIG. 6

Fig. 6—Add softened sheet gelatin to five oz. of hot water in wide-mouth bottle to make solution thick as syrup.

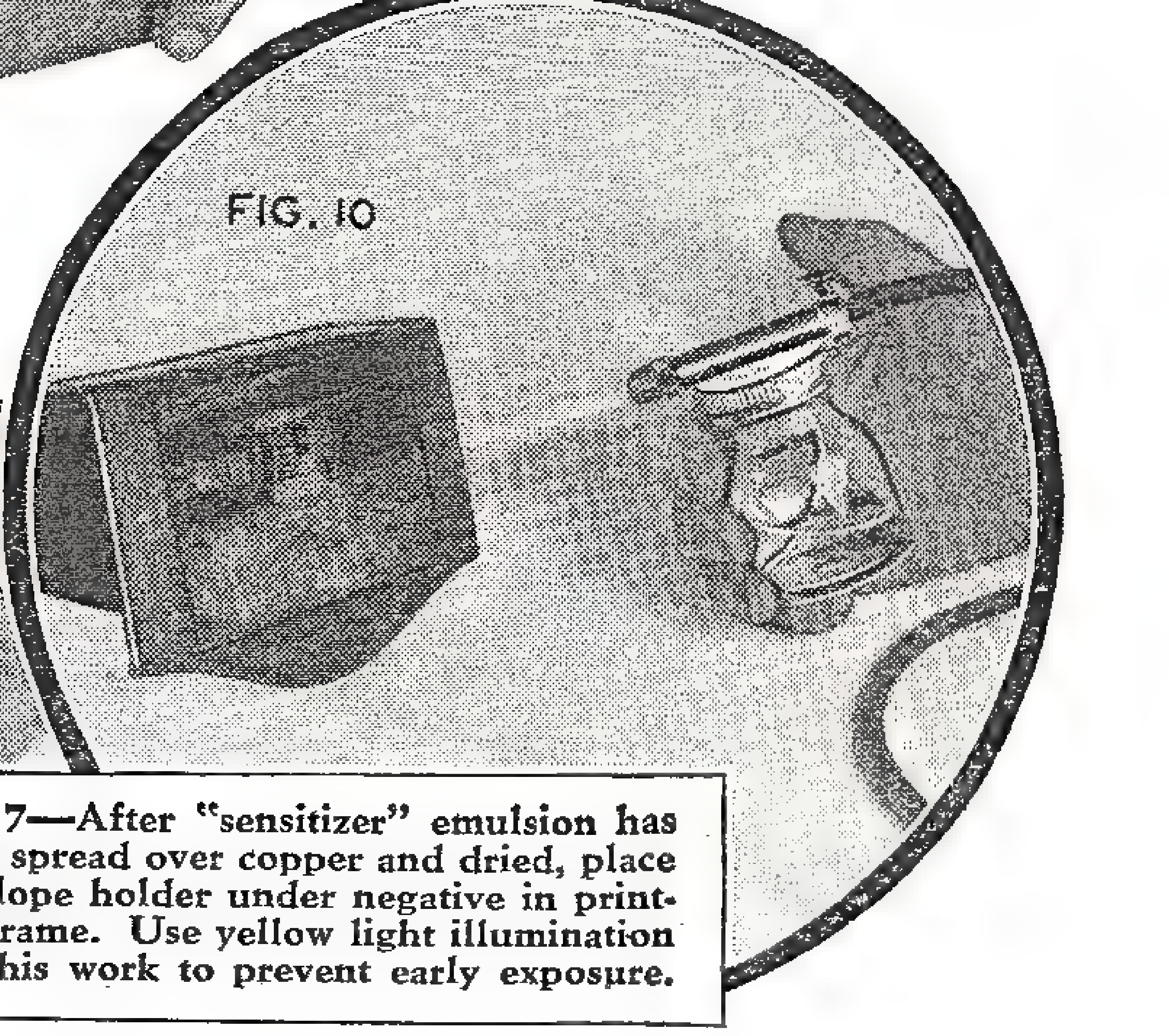


FIG. 10

Fig. 10.—Photo as well as copper face of letter holder can be protected by spraying with lacquer.

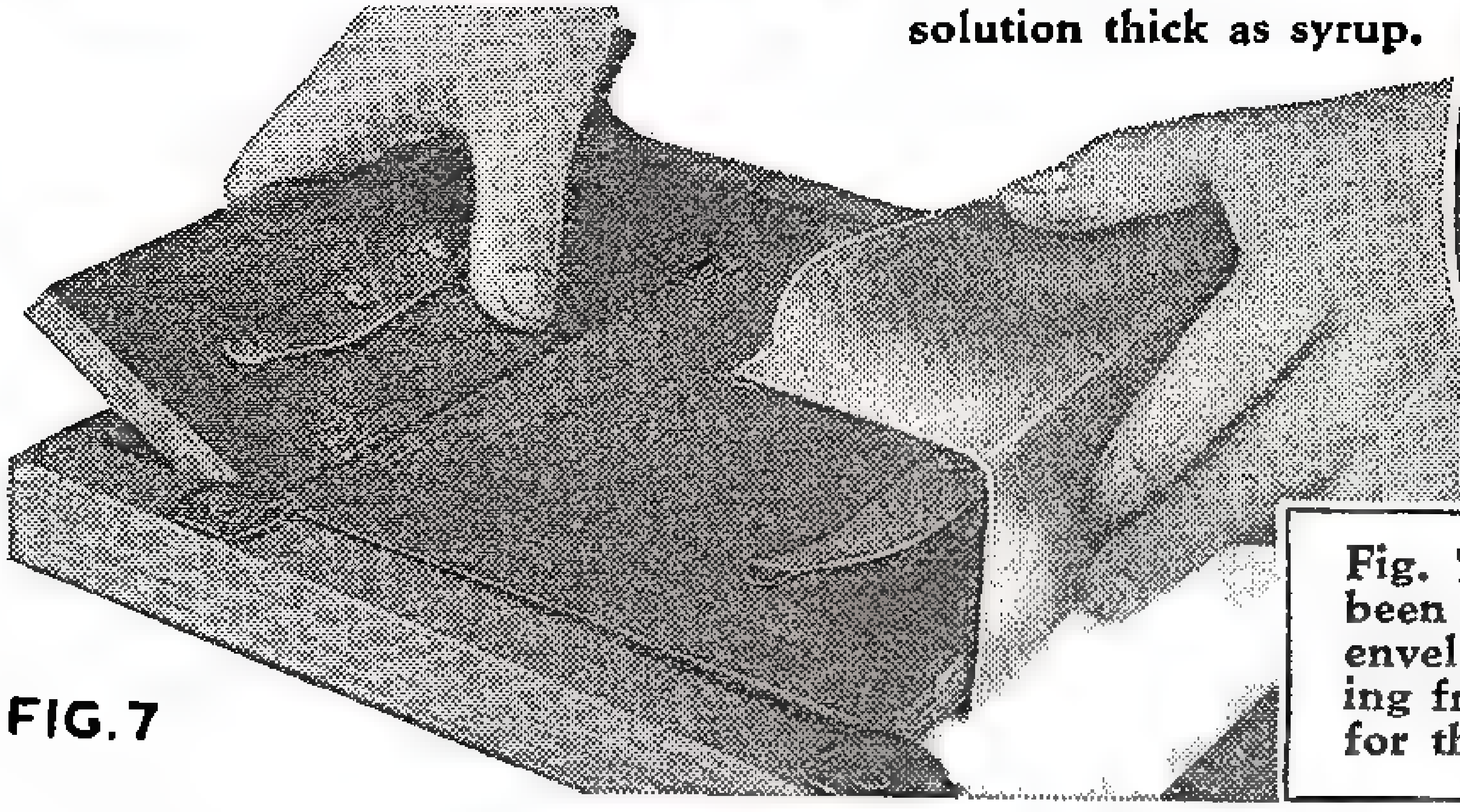
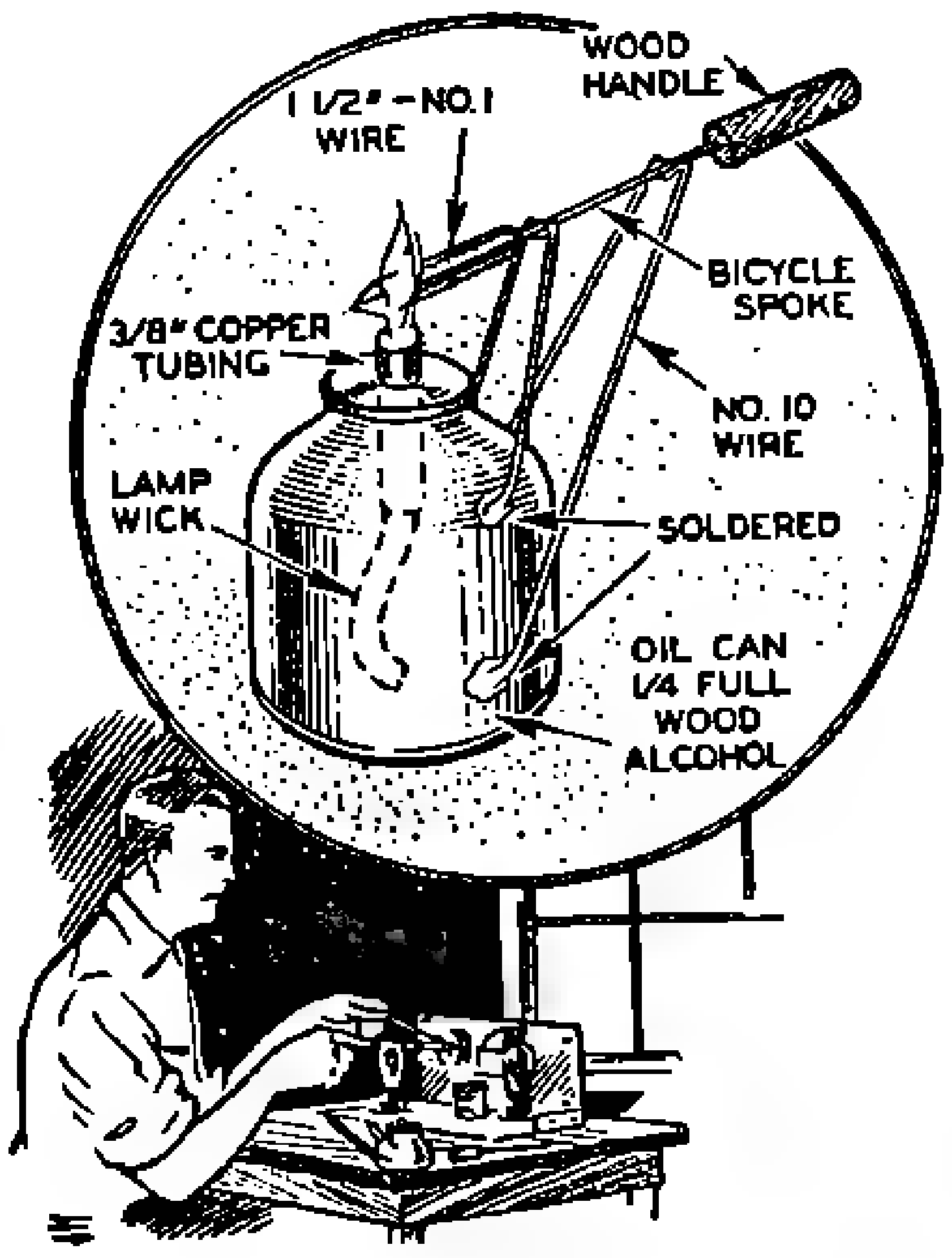


FIG.7

Fig. 7—After "sensitizer" emulsion has been spread over copper and dried, place envelope holder under negative in printing frame. Use yellow light illumination for this work to prevent early exposure.

SHOP KINKS FOR THE HANDYMAN

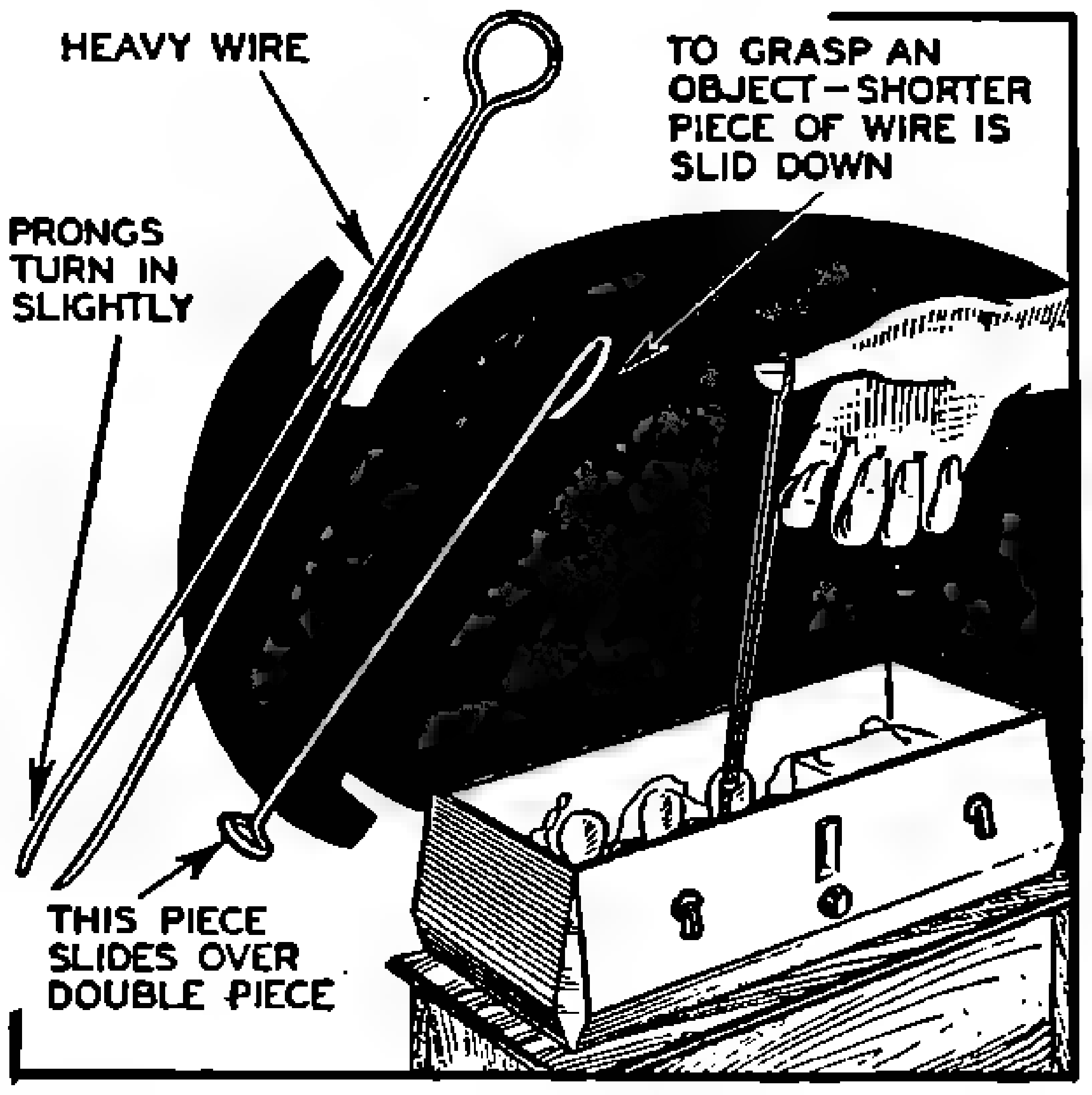

WOOD HANDLE
1 1/2" - NO. 1 WIRE
BICYCLE SPOKE
3/8" COPPER TUBING
NO. 10 WIRE
LAMP WICK
SOLDERED
OIL CAN 1/4 FULL WOOD ALCOHOL

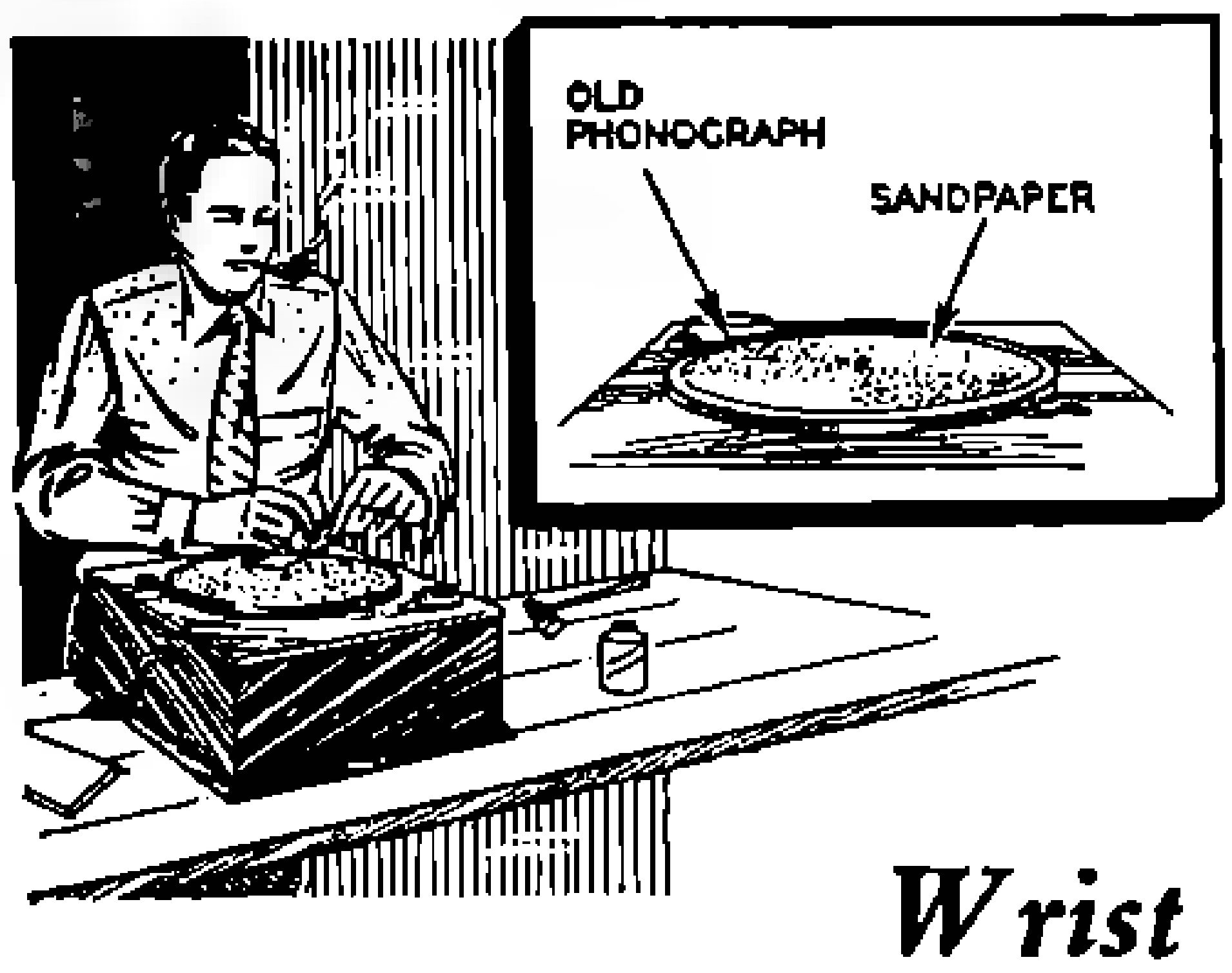
Use Alcohol Burner to Heat Radio Soldering Iron

WHERE electricity or gas is not available, this complete soldering set will be found far handier than the usual gasoline blow torch for radio work. A 1½" length of No. 1 copper wire is filed to a four cornered point, and a hole drilled into the opposite end for the bicycle spoke handle of the soldering iron. To make the heater, remove the spout from an oil can and solder in its place a length of ⅜" copper tubing. Double up a lamp wick and push it through this tube until about ⅛" projects above. Solder two supports made from No. 10 wire in place to hold the soldering iron.—Ralph Senechal.

Tongs Pick Up "Out-of-Reach" Bolts

THESE handy wire tongs will be useful to the automobile mechanic who occasionally has to recover small objects such as bolts or nuts from cramped places in transmissions or oil pans. The radio engineer, too, will find them useful in recovering nuts dropped into a crowded radio chassis. Two pieces of springy wire are shaped as in the illustrations. To pick up an object, slide the shorter wire down on the tongs; the ends come together, grasping the object. The device is easily worked with one hand.—A. Cole.


HEAVY WIRE
TO GRASP AN OBJECT—SHORTER PIECE OF WIRE IS SLID DOWN
PRONGS TURN IN SLIGHTLY
THIS PIECE SLIDES OVER DOUBLE PIECE

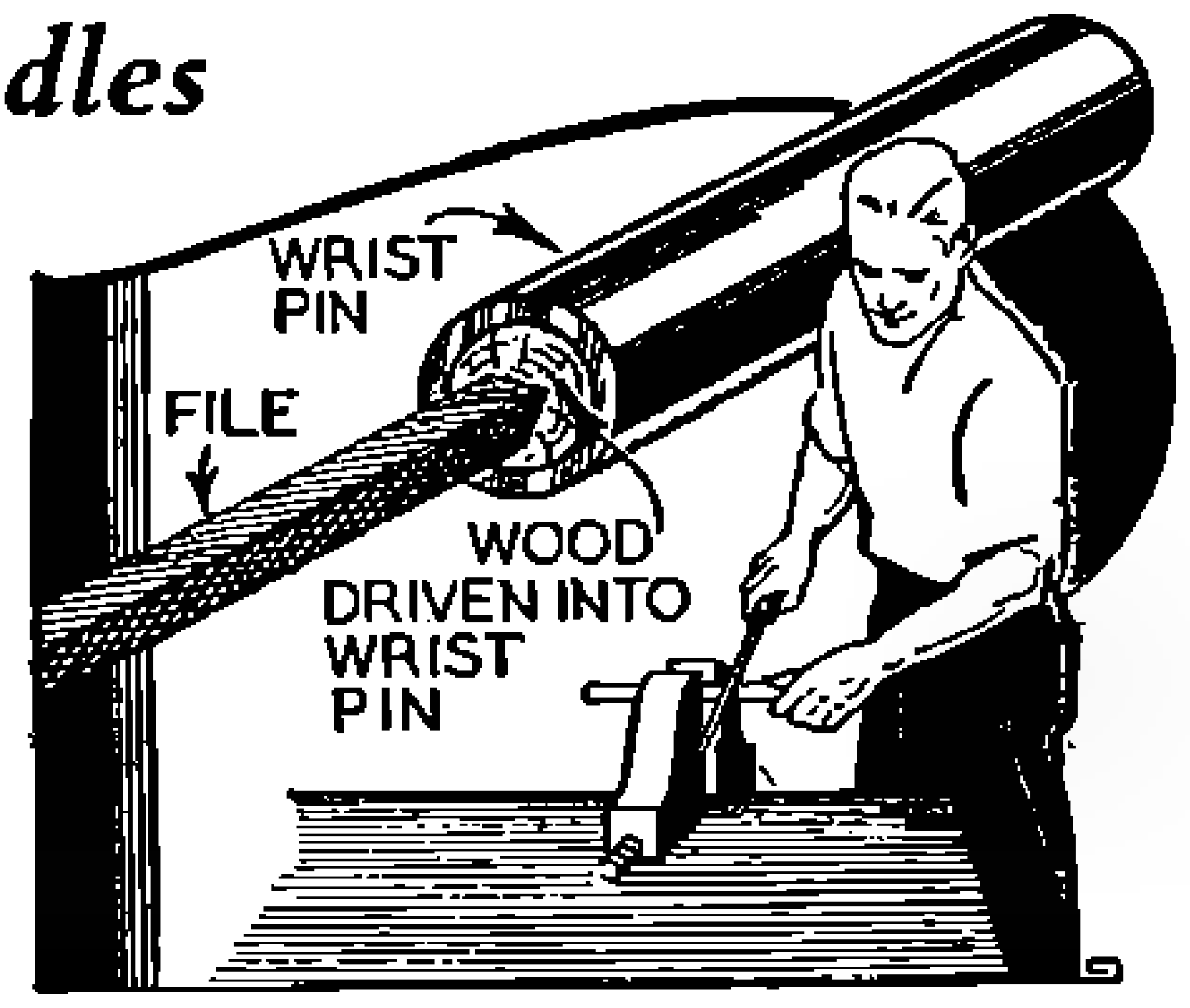

OLD PHONOGRAPH
SANDPAPER

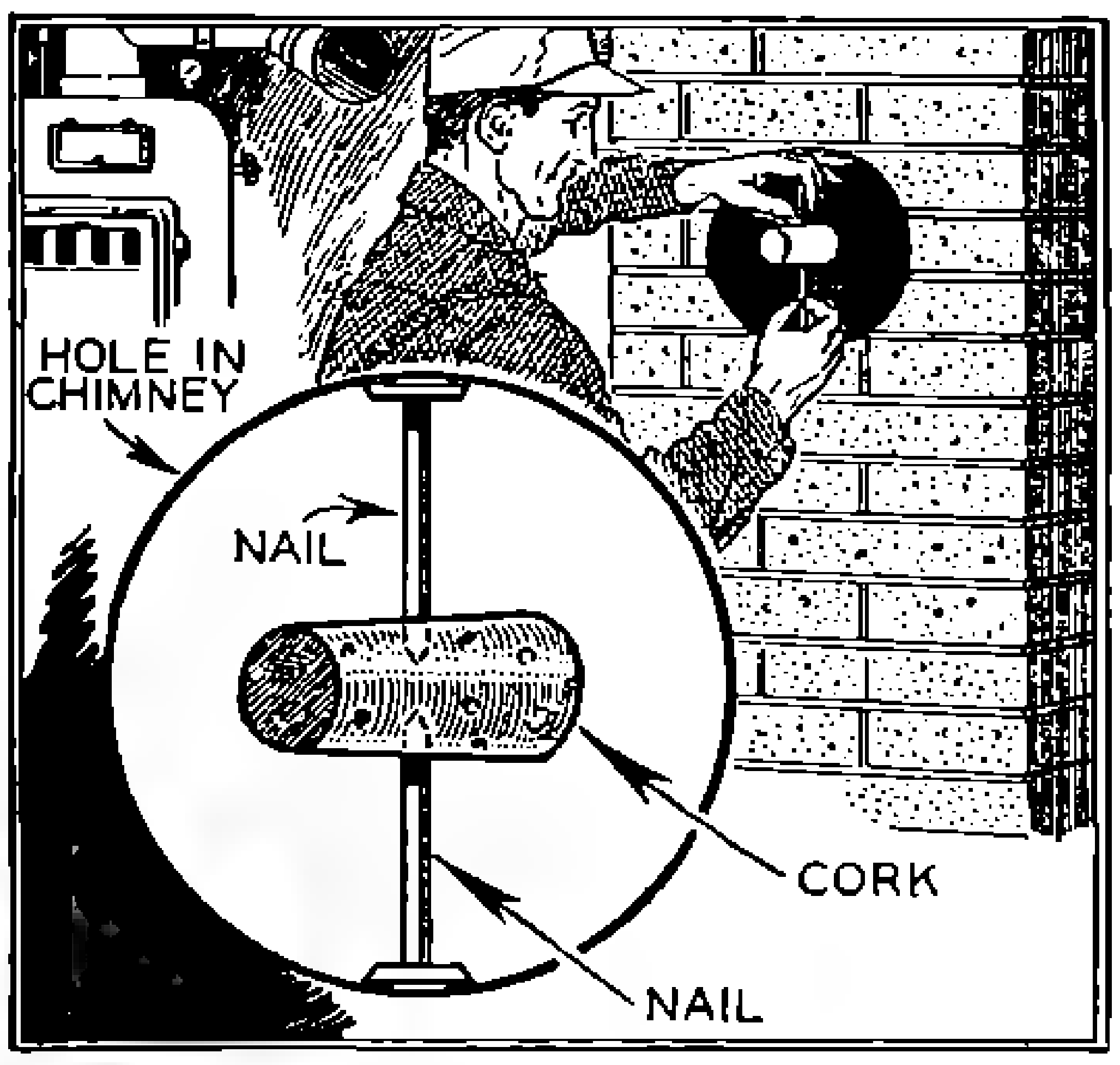
Sanding Machine

AN OLD phonograph with either spring or electric motor can be readily converted into a handy power sanding machine for the workshop. Just place a circular piece of sandpaper over the turntable, perhaps using a few drops of shellac to prevent it from slipping. Flat surfaces are accurately trued by the disc; model makers will find it useful for smoothing small objects.—Herbert Arrall.

Wrist Pins Make Sturdy File Handles

IF YOUR file and chisel handles split apart too often, try this wrist pin kink. Get a wooden peg a trifle larger than the inside diameter of the wrist pin, and pound it into the pin. Saw the wood off flush with the ends of the pin, then drill a small hole into the center of the wood on one end for the handle. This handle will prove a comfortable fit for the hand, and stand up under the heaviest of work without splitting. If used with chisels, the pin prevents wood from spreading.—LaVerne Anderson.


WRIST PIN
FILE
WOOD DRIVEN INTO WRIST PIN


HOLE IN CHIMNEY
NAIL
CORK
NAIL

Cork and Nails Make Handy Pipe Calipers

WHEN taking measurements of the inside of a furnace pipe, in order to know exactly what size pipe must be bought, the usual procedure is to mark the diameter on a stick. Errors of as much as ⅛" may occur with this makeshift method. Accurate inside calipers are readily made from a cork and two long nails. Press one of the nails into each end of the cork, as shown in the accompanying drawing, adjusting them so they will slip into the opening. The calipers can now be taken to the store and used to find the exact flue pipe needed. The same calipers will, of course, be found useful for many other purposes about the shop and home.—A. Vena.

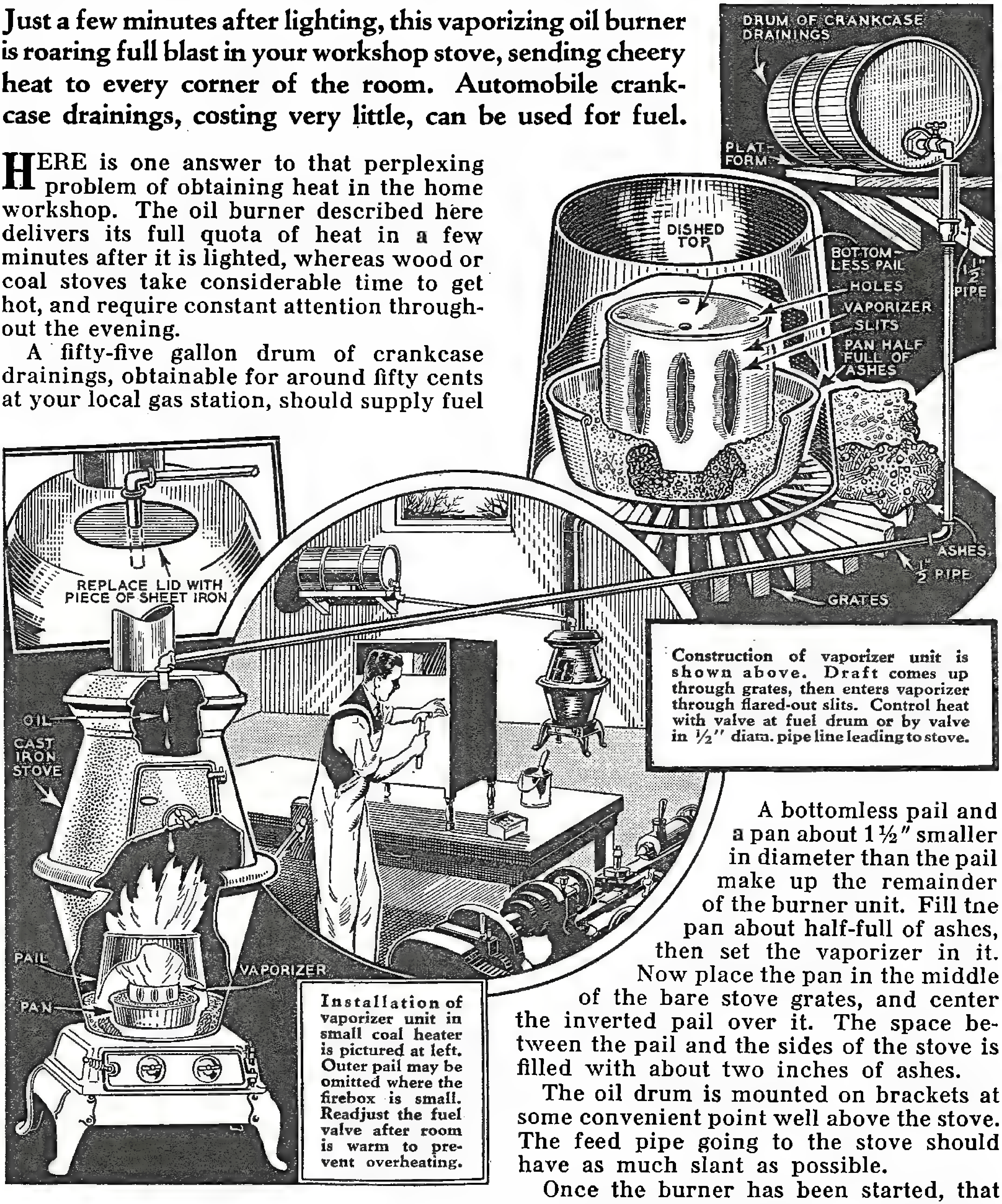
OIL BURNER *Heats Workshop Cheaply*

Just a few minutes after lighting, this vaporizing oil burner is roaring full blast in your workshop stove, sending cheery heat to every corner of the room. Automobile crankcase drainings, costing very little, can be used for fuel.

HERE is one answer to that perplexing problem of obtaining heat in the home workshop. The oil burner described here delivers its full quota of heat in a few minutes after it is lighted, whereas wood or coal stoves take considerable time to get hot, and require constant attention throughout the evening.

A fifty-five gallon drum of crankcase drainings, obtainable for around fifty cents at your local gas station, should supply fuel for about one month's operation of this burner.

The heart of the burner is the vaporizer, an inverted gallon paint can having a dished top. Be sure the can you use has clinched seams. Dish the bottom in with a ball pein hammer, then punch out five holes with a nail, one in the center and four close to the edge. Six slits opening outward for about ¼″ are cut into the sides from top to bottom, to supply necessary draft.



Construction of vaporizer unit is shown above. Draft comes up through grates, then enters vaporizer through flared-out slits. Control heat with valve at fuel drum or by valve in ½″ diam. pipe line leading to stove.

Installation of vaporizer unit in small coal heater is pictured at left. Outer pail may be omitted where the firebox is small. Readjust the fuel valve after room is warm to prevent overheating.

A bottomless pail and a pan about 1½″ smaller in diameter than the pail make up the remainder of the burner unit. Fill the pan about half-full of ashes, then set the vaporizer in it. Now place the pan in the middle of the bare stove grates, and center the inverted pail over it. The space between the pail and the sides of the stove is filled with about two inches of ashes.

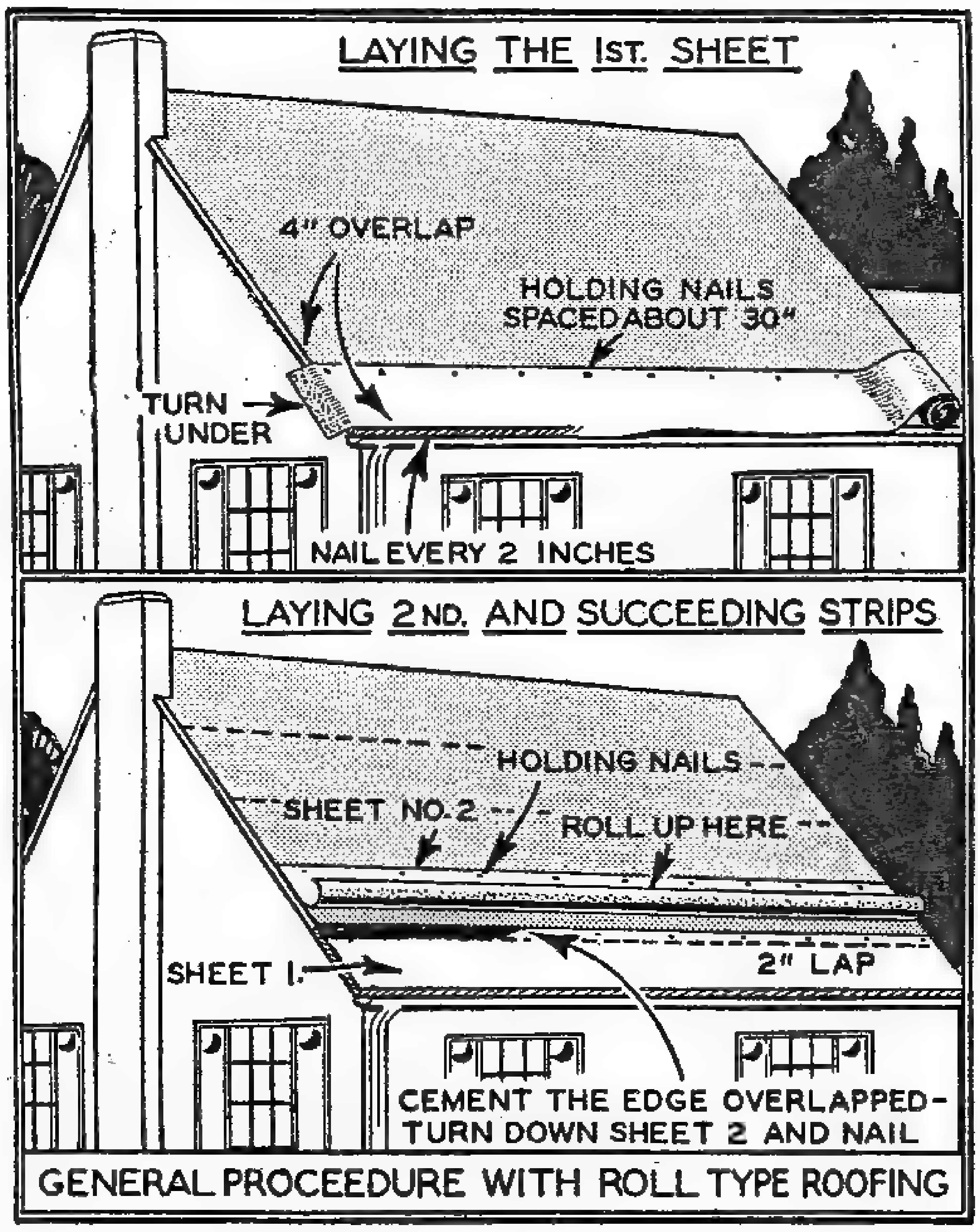
The oil drum is mounted on brackets at some convenient point well above the stove. The feed pipe going to the stove should have as much slant as possible.

Once the burner has been started, that oil which strikes the top of the vaporizer is practically all consumed; a small portion seeps through the holes to burn below, keeping the vaporizer top hot.

Starting is simple and quick. Merely pour a cupful of kerosene on the vaporizer, then open the oil valve until a stream about 1/16″ in diameter flows into the pipe. Toss a lighted match into the vaporizer; in a few minutes the cheerfully roaring blowtorch noise will be heard.

How to IMPROVE *That*

by DALE R. VAN HORN


LAYING THE 1ST. SHEET
4" OVERLAP
HOLDING NAILS SPACED ABOUT 30"
TURN UNDER
NAIL EVERY 2 INCHES
LAYING 2ND. AND SUCCEEDING STRIPS
HOLDING NAILS
SHEET NO. 2
ROLL UP HERE
SHEET 1.
2" LAP
CEMENT THE EDGE OVERLAPPED-TURN DOWN SHEET 2 AND NAIL
GENERAL PROCEEDURE WITH ROLL TYPE ROOFING

Above drawings show how to apply roll roofing. Put first strip on lower edge overlapping next until roof is done.

THE roof is the crown on your home. No matter how good the walls, what expensive furniture inside, or how well the rest of the structure has been built, without a good roof, your abode is not first class.

A suitable covering, both weatherproof and durable, plus adequate support underneath are the two fundamentals of a good roof. Details may vary. Many homes today are covered with composition shingles having fire-resisting properties, incorporating the advantages of color combinations. A goodly number of home owners still prefer good old fashioned red shingles. The type of roofing material is largely up to you.

If you go into your attic on a bright day and note many pin holes of light showing through, you easily will come to the conclusion that your roof is in line for a new dress. With this inspection comes, too, the condition of the eaves, the valleys, any sagging point, and whether the roof meets the wall without any sign of a gap.

One of the newer trends is to close gaps of this nature with a special material, forced into space with a gun not unlike the type used for force-greasing the automobile. There is no need to mention that the chief advantage of tight unions between walls and

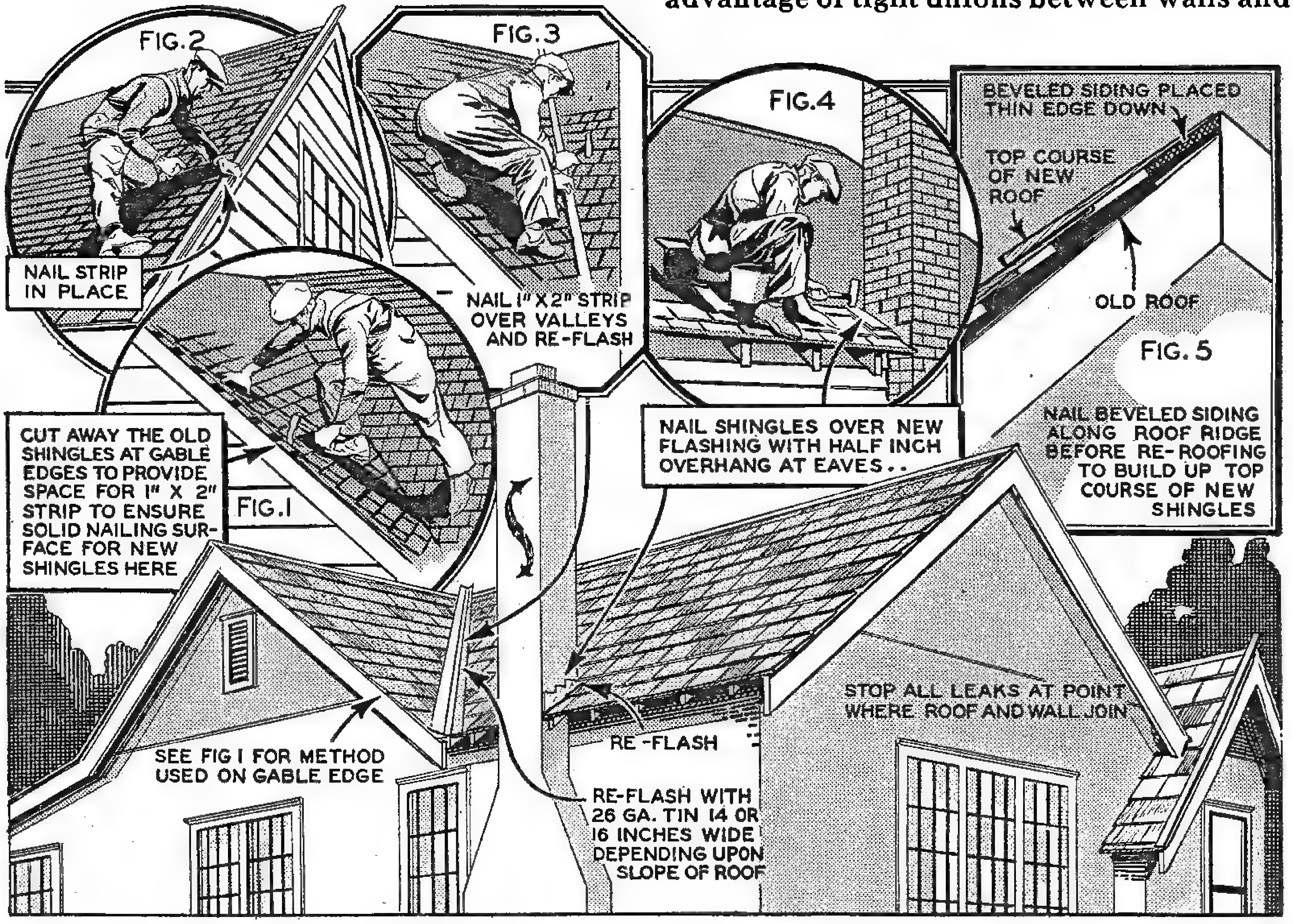
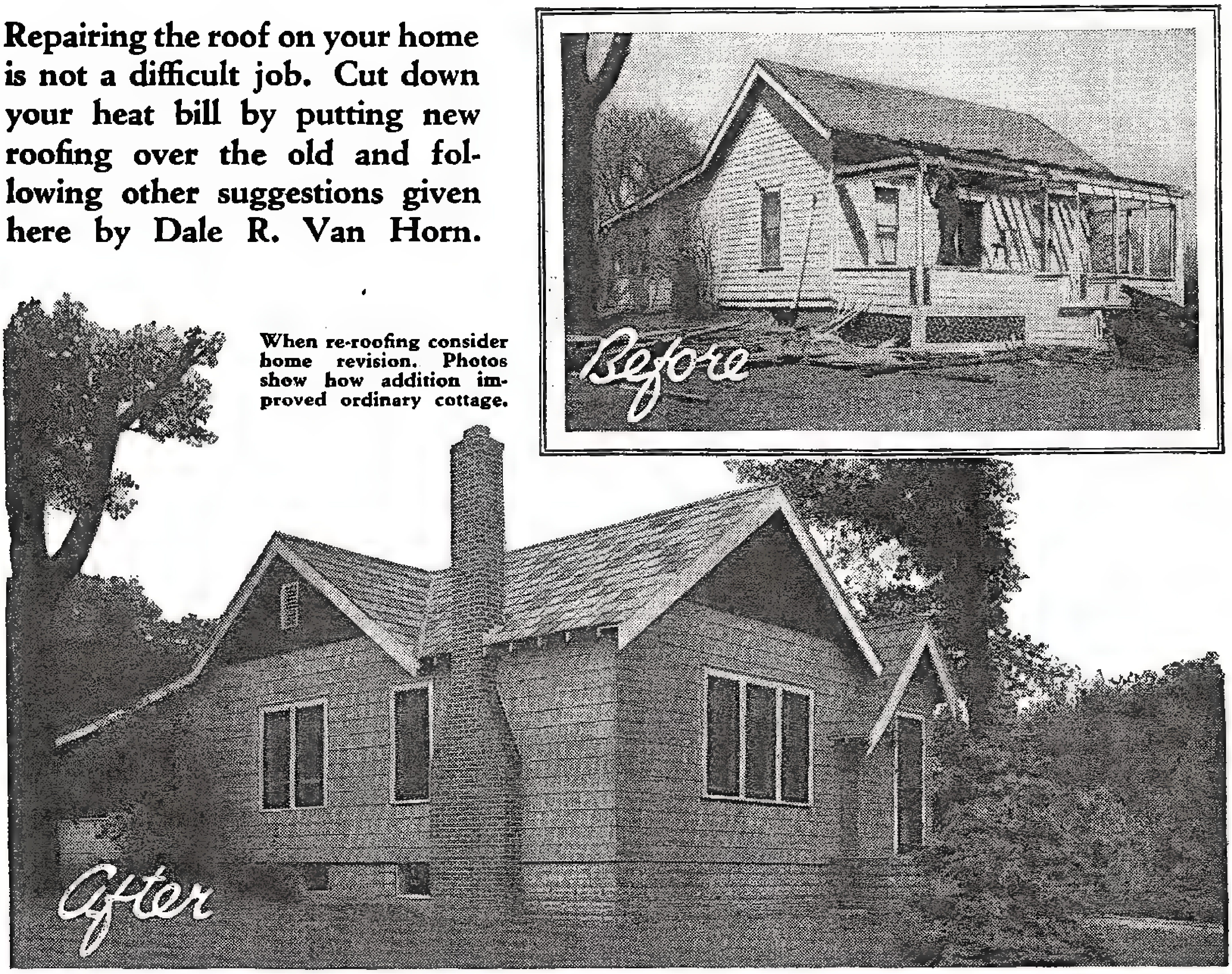


FIG.2
FIG.3
FIG.4
BEVELED SIDING PLACED THIN EDGE DOWN
TOP COURSE OF NEW ROOF
OLD ROOF
FIG. 5
NAIL BEVELED SIDING ALONG ROOF RIDGE BEFORE RE-ROOFING TO BUILD UP TOP COURSE OF NEW SHINGLES
NAIL STRIP IN PLACE
NAIL 1"X2" STRIP OVER VALLEYS AND RE-FLASH
CUT AWAY THE OLD SHINGLES AT GABLE EDGES TO PROVIDE SPACE FOR 1" X 2" STRIP TO ENSURE SOLID NAILING SURFACE FOR NEW SHINGLES HERE
FIG.1
NAIL SHINGLES OVER NEW FLASHING WITH HALF INCH OVERHANG AT EAVES..
STOP ALL LEAKS AT POINT WHERE ROOF AND WALL JOIN
SEE FIG I FOR METHOD USED ON GABLE EDGE
RE-FLASH
RE-FLASH WITH 26 GA. TIN 14 OR 16 INCHES WIDE DEPENDING UPON SLOPE OF ROOF

Figures illustrate steps in putting new shingles over old roof. Shingles at gable edge are cut off and replaced with nailing strip. Old flashings remain, the new flashings being placed over them. Shingle from bottom upwards.

ROOF on YOUR HOUSE

Repairing the roof on your home is not a difficult job. Cut down your heat bill by putting new roofing over the old and following other suggestions given here by Dale R. Van Horn.



When re-roofing consider home revision. Photos show how addition improved ordinary cottage.

roof, or between wood and masonry, is the saving of heat in winter.

Whereas a few years ago a yard cluttered with old broken shingles and a general mess proclaimed to one and all that the Jones' were having their roof recovered—today that confusion is missing. Putting the new roof right on over the old is smart because of the saving of labor and debris, and because the old covering plus the new gives greater roof insulation properties.

Approaching the job in the proper manner, it will be wise to keep in mind the several steps portrayed in an accompanying group of illustrations. Note that the shingles are cut away from all edges to permit the laying of a strip. (See Figs. 1 and 2). This applies to roof edges, the ridge and dormers as well. Instead of tearing out old valleys and flashings, foundations for new sheet metal are built up easily as shown in Figs. 3 and 4. From then on, the work progresses much as though the house were new and it was being roofed for the first time.

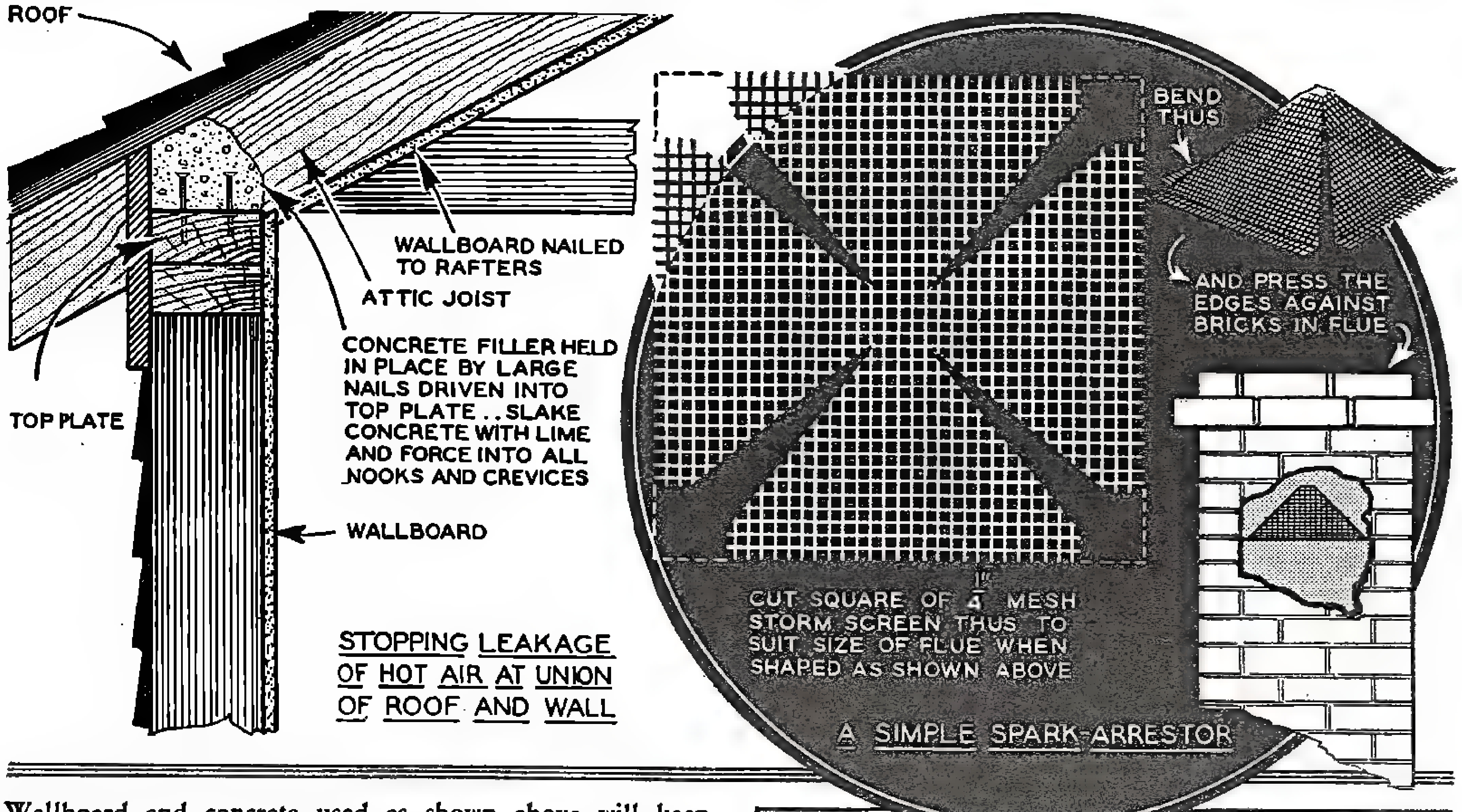
Of even simpler application is composition roll roofing, which is laid on as indicated in accompanying drawings. Those of you who insist upon asbestos base composition roofing have a choice of the roll roofing, and individual squares of composition asbestos or slate.

Some wooden shingles are chemically treated to make them fire resisting. Sometimes the roof is fundamentally good, does not warrant the cost of a recovering job. Then by careful patching, and particularly by staining the shingles, a new-roof appearance results.

When doing over your roof, keep in mind the possibility of finishing the attic. If this is contemplated in the near future, then the floor space should be divided into the future rooms and the studding set in place at this time. Later it will be only a matter of applying the wall finish material and this addition of the studding will more firmly brace the roof timbers.

One of the best ways to chink spaces between the wall top and the roof is with concrete mortar to which has been added a

Use Wallboard and Concrete to Stop Heat Leaks in Roof of Your Home


ROOF
WALLBOARD NAILED TO RAFTERS
ATTIC JOIST
CONCRETE FILLER HELD IN PLACE BY LARGE NAILS DRIVEN INTO TOP PLATE . . SLAKE CONCRETE WITH LIME AND FORCE INTO ALL NOOKS AND CREVICES
TOP PLATE
WALLBOARD
STOPPING LEAKAGE OF HOT AIR AT UNION OF ROOF AND WALL
BEND THUS
AND PRESS THE EDGES AGAINST BRICKS IN FLUE
CUT SQUARE OF ¼" MESH STORM SCREEN THUS TO SUIT SIZE OF FLUE WHEN SHAPED AS SHOWN ABOVE
A SIMPLE SPARK-ARRESTOR

Wallboard and concrete used as shown above will keep warm air from escaping. At right is a spark arrestor for the chimney. It is simply pressed down inside the flue.

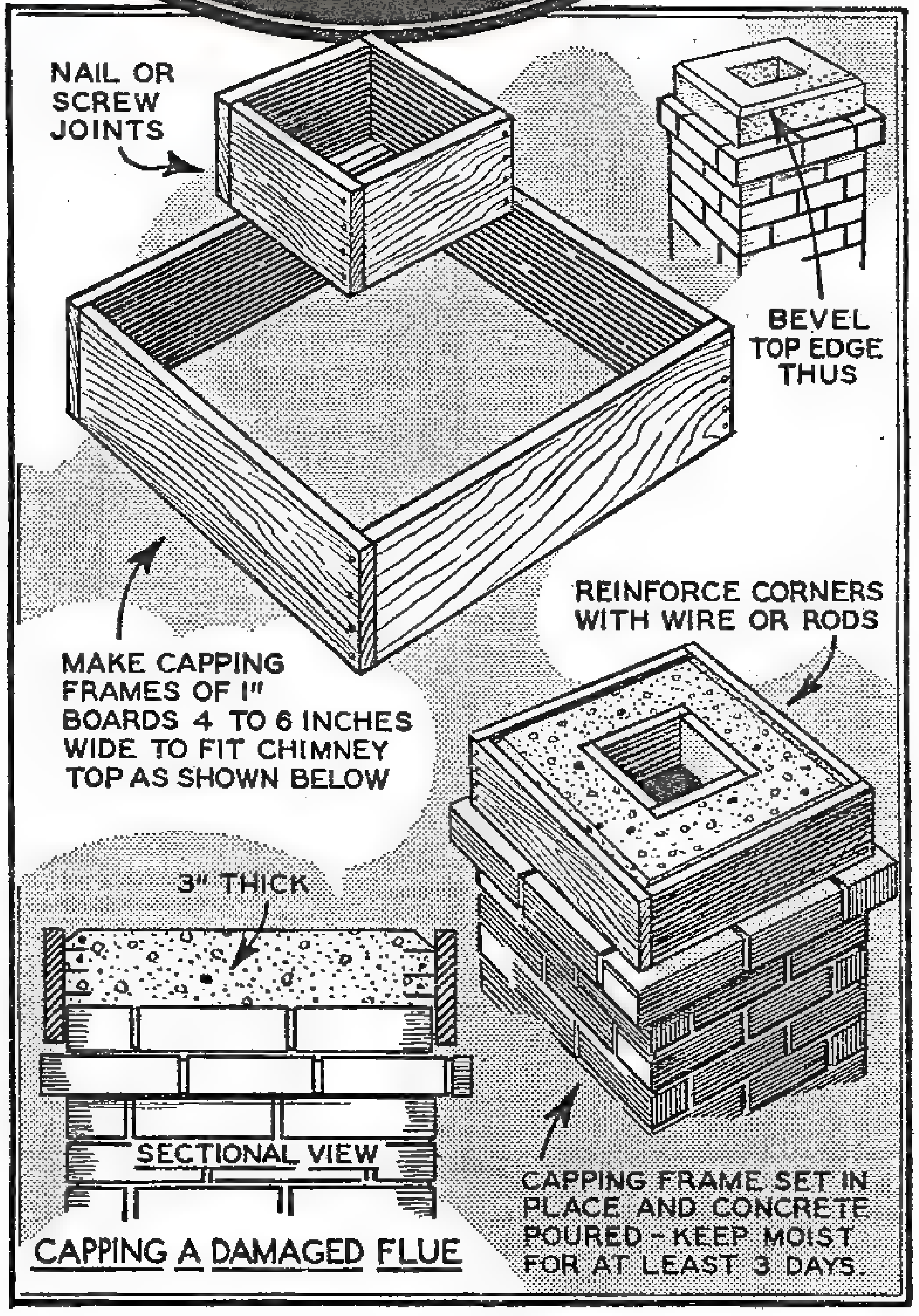
small amount of slaked lime. This can be mixed right in the attic and placed on top of the walls and forced into all crevices. Nails driven into the timber on which the rafters rest will hold these sections of concrete firmly in place as shown in the illustration.

Since warm air from rooms below will work up under the roof if it can, it is important that the roof be as tight as possible. Sealing with the caulked joints and with concrete under the eaves is mighty helpful, but further insulation properties can be accomplished by nailing inexpensive wall board to the underside of the roof rafters. This can most economically be done in conjunction with a general finishing of the attic.

By all means, thoroughly inspect the flue at this time. A chimney which rests on a wood platform is always a fire hazard. If this type exists, it should be removed and a chimney resting firmly on a concrete foundation substituted. Inspect closely, too, for spots in the chimney in which the mortar has loosened or worked out of joints. Such a condition is inviting a fire of the worst sort.

The decay or gradual disintegration of mortar joints in a chimney usually occurs most rapidly at the top. Here fumes from the furnace plus all kinds of weather conditions will gradually loosen the top row of brick.

Topping the chimney with a concrete mortar cap is the remedy. This step requires but two forms made from 1-inch material. An accompanying illustration shows the method. The cap itself should be 3 or 4 inches thick, with the top edges beveled and all four corners reinforced with galvanized wire or iron rods. Clean the top bricks well and soak them thoroughly before pouring the mortar. After pouring, the concrete should be kept moist for three days or longer to insure proper curing. Cover with moist rags or sprinkle with water.

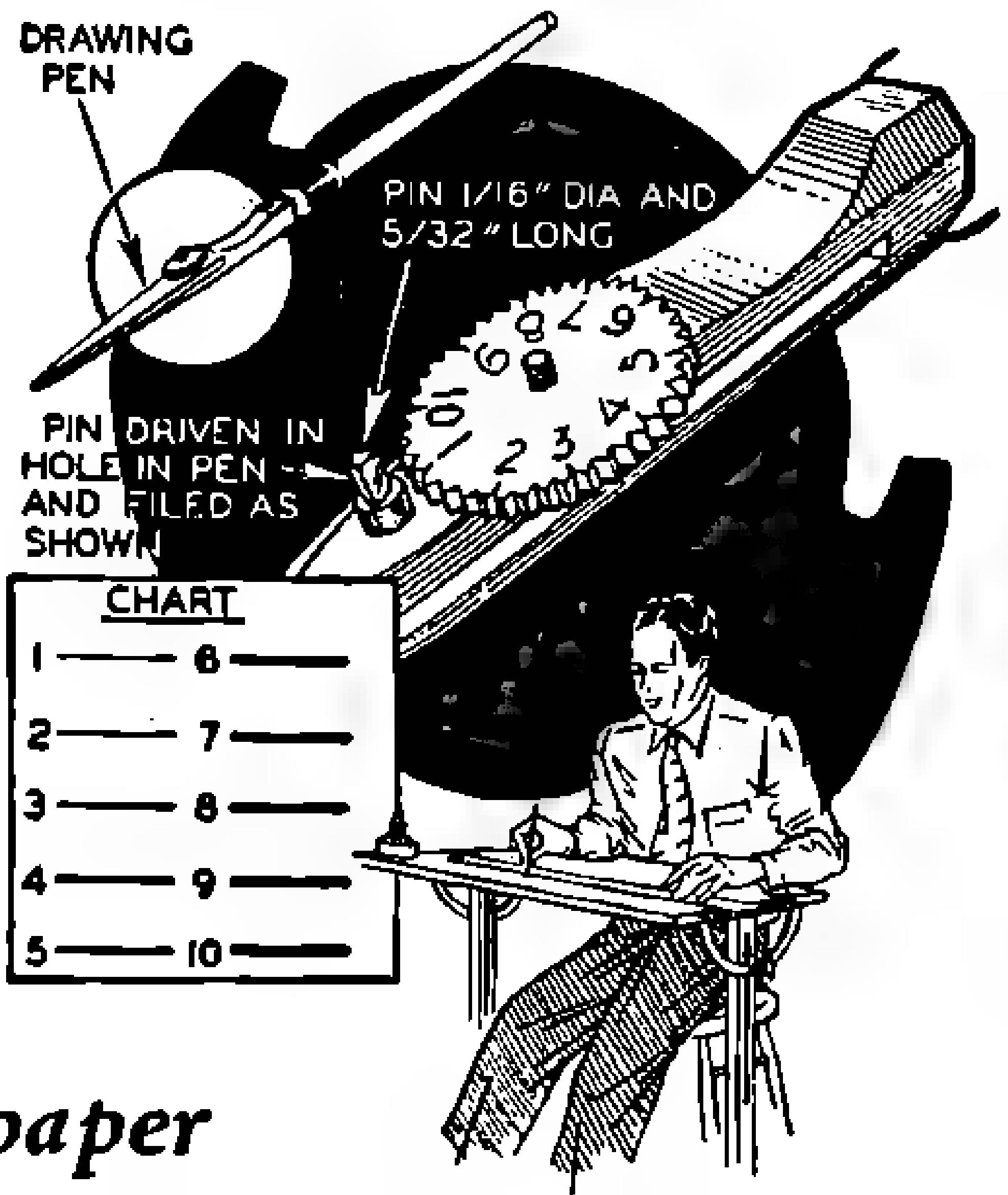

NAIL OR SCREW JOINTS
BEVEL TOP EDGE THUS
MAKE CAPPING FRAMES OF 1" BOARDS 4 TO 6 INCHES WIDE TO FIT CHIMNEY TOP AS SHOWN BELOW
REINFORCE CORNERS WITH WIRE OR RODS
3" THICK
SECTIONAL VIEW
CAPPING A DAMAGED FLUE
CAPPING FRAME SET IN PLACE AND CONCRETE POURED - KEEP MOIST FOR AT LEAST 3 DAYS

The concrete capping shown above will preserve the chimney top for years. Only two simple wood forms are needed.

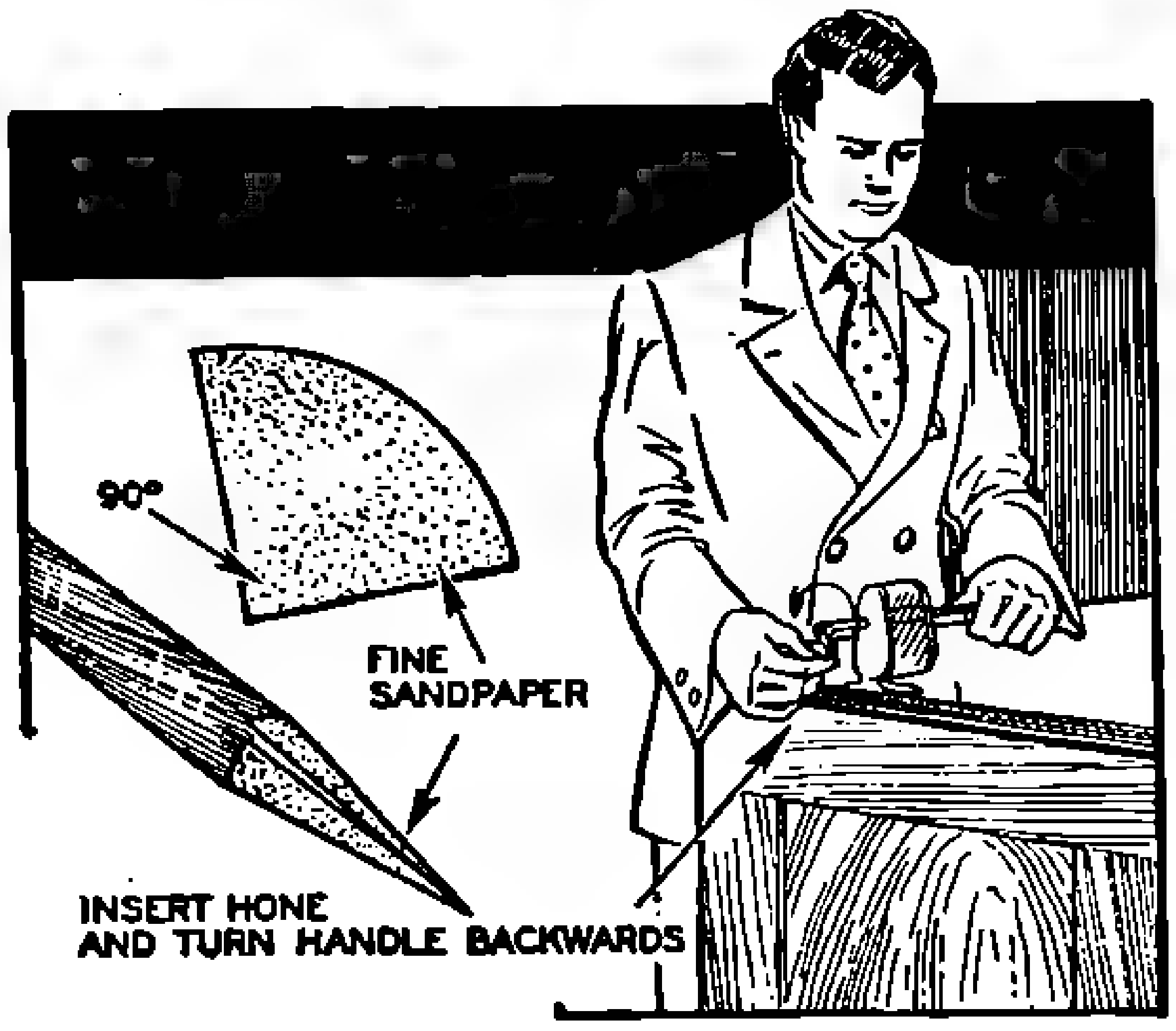
DRAFTING TABLE HANDIKINKS

Handy Line-Width Indicator for Drawing Pens

THIS easily made indicator on your drawing pen provides an instant and accurate setting of the pen to any desired thickness. A hole is bored into the blade just ahead of the knurled adjusting nut to make a driving fit for a 1/16" pin about 5/32" long. File the outer end of the pin to a triangular shape with vertex pointing to the nut. Now get a jeweler friend to engrave ten equal divisions on the face of the knurled nut, numbering each. For finer adjustment, use the knurled points for setting marks. The pen can be opened for cleaning at any time.—J. A. Emmett.


DRAWING PEN
PIN 1/16" DIA AND 5/32" LONG
PIN DRIVEN IN HOLE IN PEN AND FILED AS SHOWN
CHART
1 6
2 7
3 8
4 9
5 10

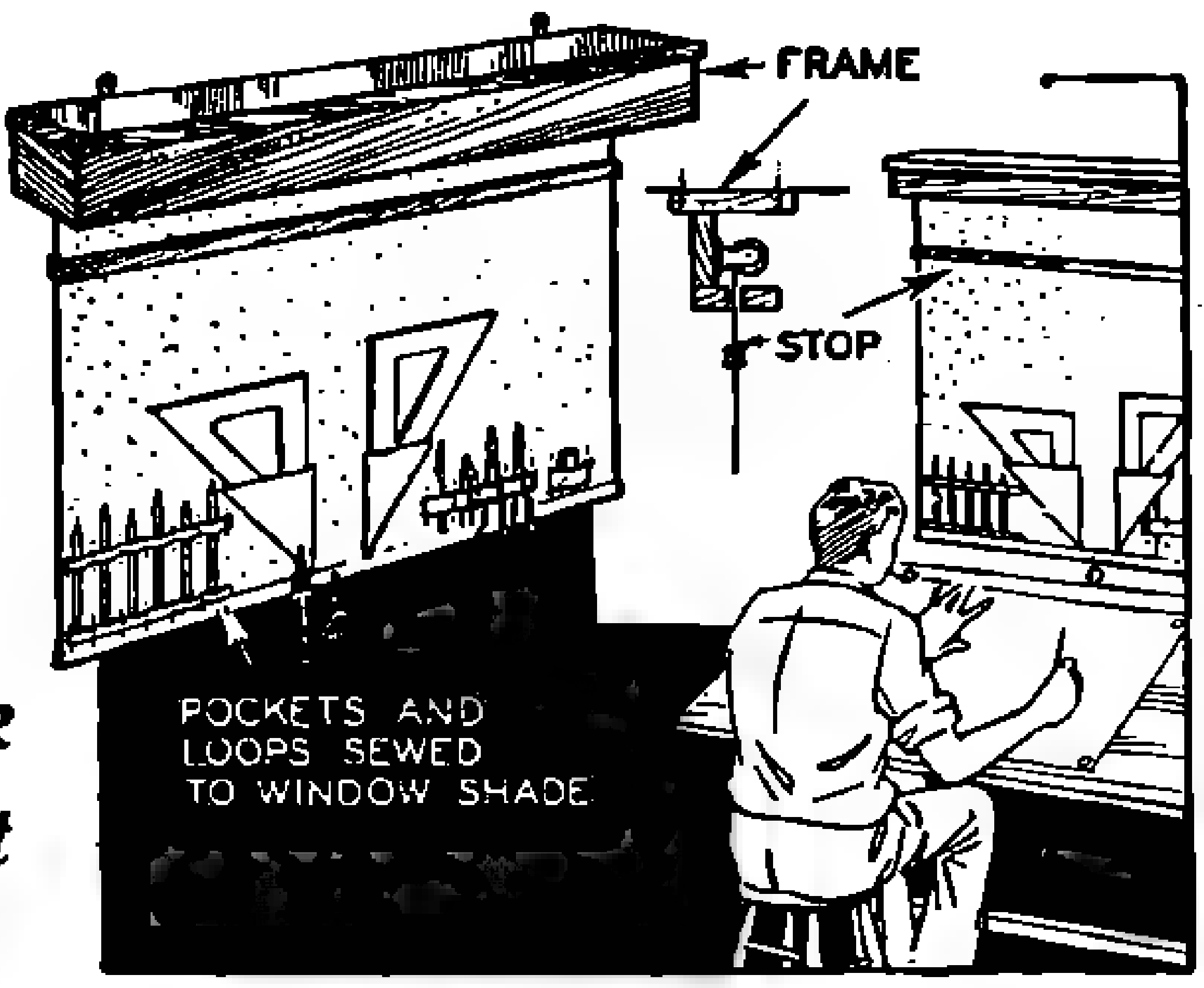
Pencil Sharpener Honed With Sandpaper


90°
FINE SANDPAPER
INSERT HONE AND TURN HANDLE BACKWARDS

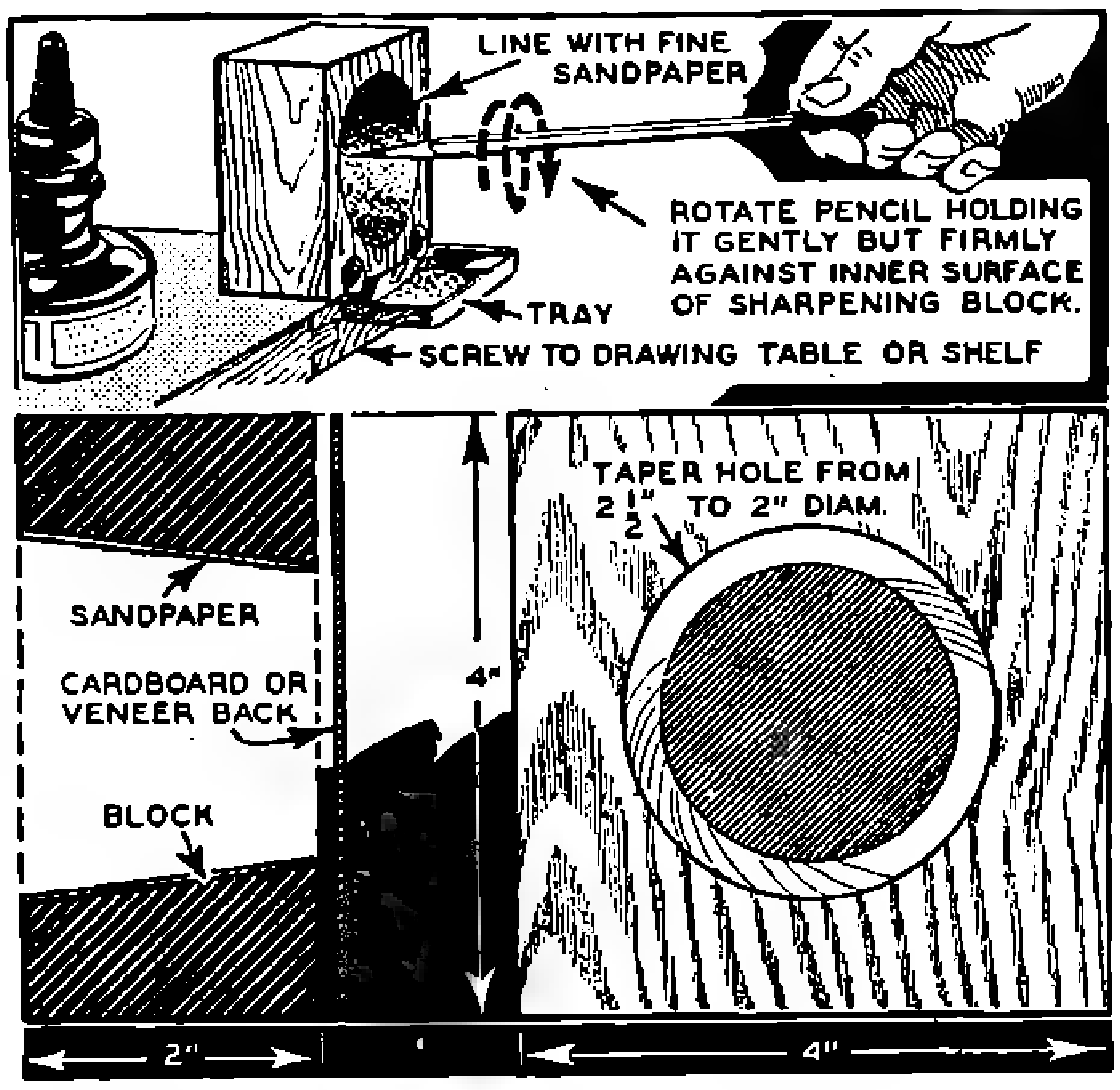
WHEN a pencil sharpener literally chews up a pencil instead of cutting it cleanly, the cutters need re-sharpening. A simple hone can be made in a few minutes from a small piece of very fine sandpaper or emery paper and a sharpened pencil. Cut the abrasive material into the shape of a quarter-circle, then securely glue it over the pencil point. Insert the hone, then turn the pencil sharpener backwards for a brief interval.—A. V. Kobza.

Drawing Instruments Stored on Shade

A SHADE with roller mounted above the drafting table comes very close to being the ideal method of storing drawing instruments. Pockets and loops sewed to the lower end of the shade provide room for drafting tools. Entire shade is easily raised should draftsman prefer to stand up for a time.—J. E. Hyler.


FRAME
STOP
POCKETS AND LOOPS SEWED TO WINDOW SHADE

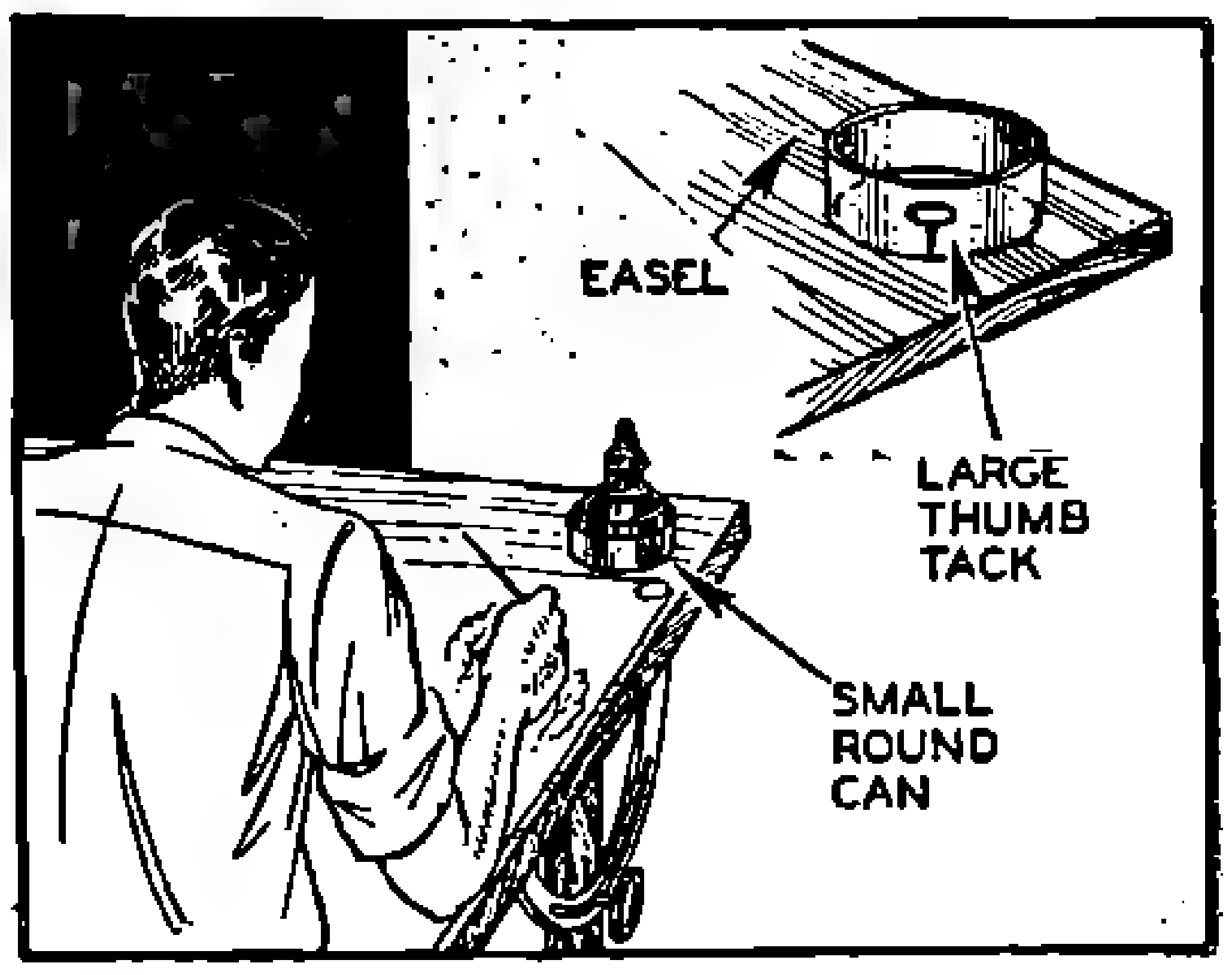
Handy Block Gives Point to Pencils


LINE WITH FINE SANDPAPER
ROTATE PENCIL HOLDING IT GENTLY BUT FIRMLY AGAINST INNER SURFACE OF SHARPENING BLOCK.
TRAY
SCREW TO DRAWING TABLE OR SHELF
SANDPAPER
CARDBOARD OR VENEER BACK
BLOCK
TAPER HOLE FROM 2½" TO 2" DIAM.
4"
2"
4"

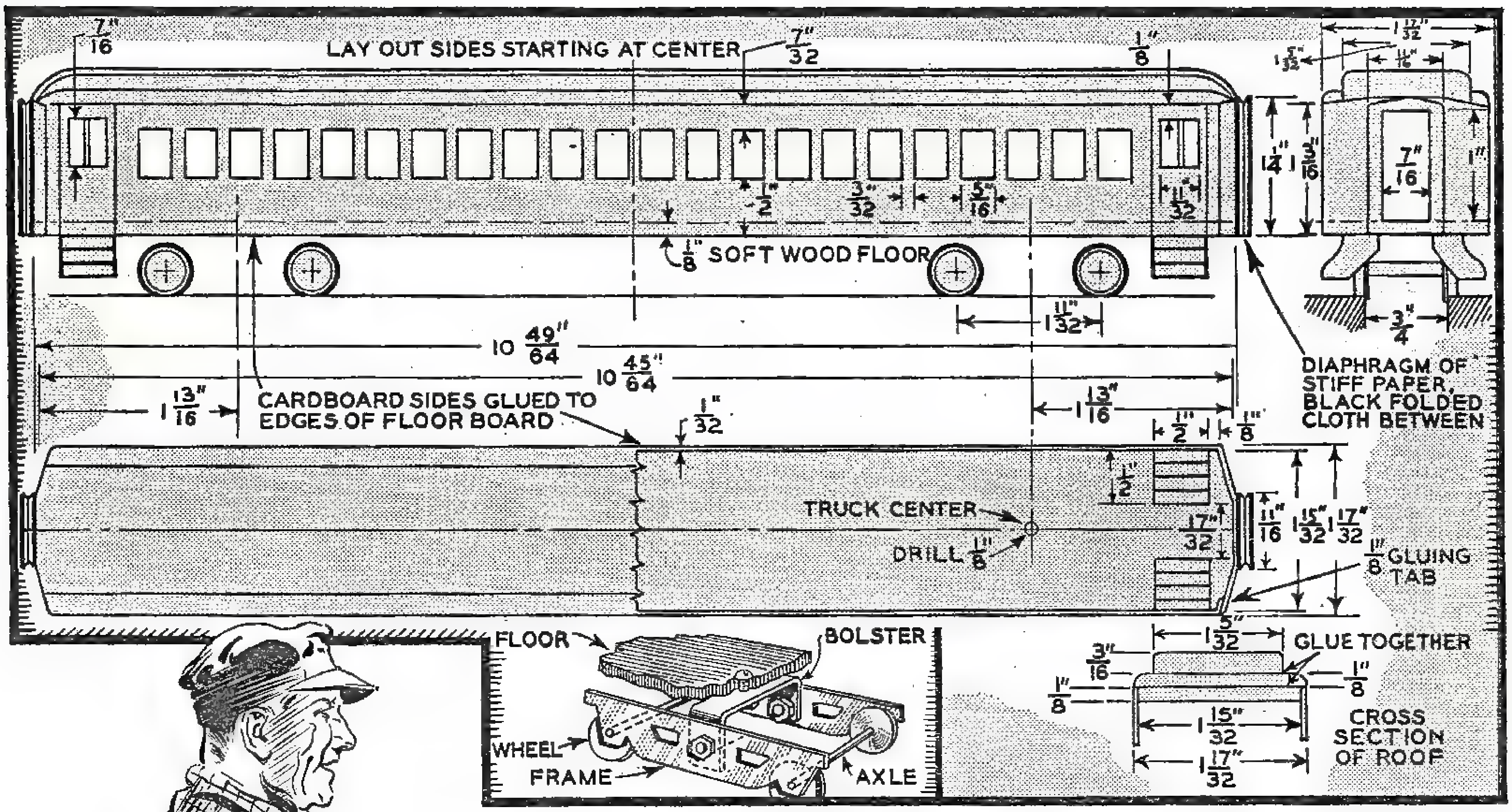
KEEPING a sharp, true point on pencils is one of the minor annoyances of the drafting table. The sharpening block shown in the sketch at left produces a sharp even point with great ease and speed, but is small enough to be fastened directly to the drawing board. Roughly sharpen the pencil in the usual manner, then twirl the point inside the block, taking care to maintain an even pressure.—D. Rolfe.

Simple Ink Bottle Holder

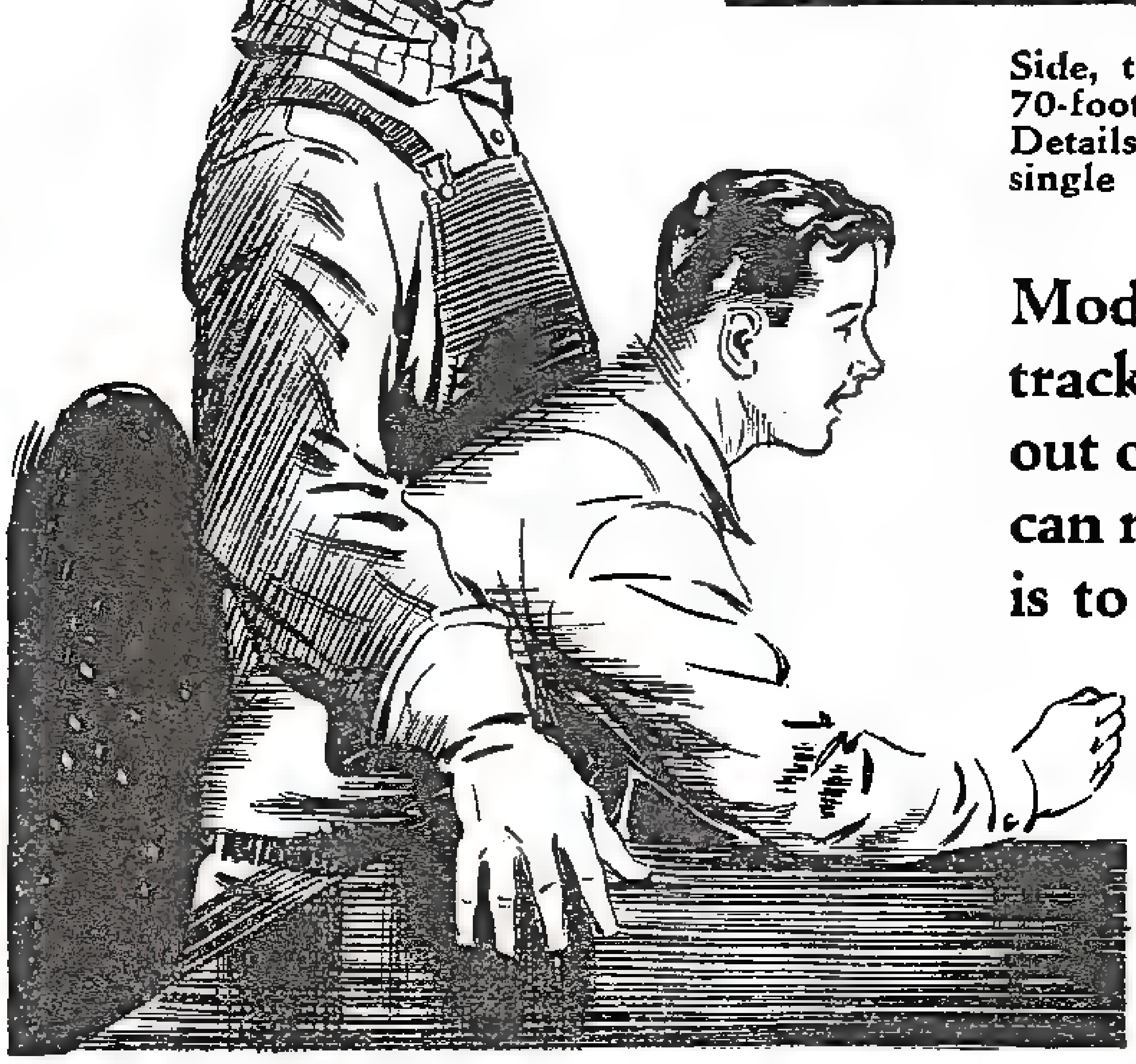
A COMMON tin can about two inches in diameter can be quickly made into a simple yet practical ink bottle holder for the drawing board. Cut the can down to a height of about 1½", then punch a small hole in the center of the bottom. Fasten the can to the drawing board at the most convenient spot, using a large thumb tack. The bottle may be readily wedged into its holder with a few strips of paper.—M. G. Winterton.


EASEL
LARGE THUMB TACK
SMALL ROUND CAN

Build an 00-Gauge COACH


7/16"
LAY OUT SIDES STARTING AT CENTER
7/32"
1/8"
1 1/32"
1/16"
1 1/4"
1 3/16"
7/16"
1"
1/2"
3/32"
5/16"
11/32"
1/8" SOFT WOOD FLOOR
1 1/32"
3/4"
10 49/64"
10 45/64"
1 13/16"
CARDBOARD SIDES GLUED TO EDGES OF FLOOR BOARD
1/32"
1 13/16"
1/2"
1/8"
DIAPHRAGM OF STIFF PAPER, BLACK FOLDED CLOTH BETWEEN
TRUCK CENTER
DRILL 1/8"
1/2"
17/32"
11/16"
1 15/32"
1 17/32"
1/8" GLUING TAB
FLOOR
BOLSTER
WHEEL
FRAME
AXLE
3/16"
1/8"
1 5/32"
GLUE TOGETHER
1/8"
1 15/32"
1 17/32"
CROSS SECTION OF ROOF

Side, top, and end views of 00-gauge coach are based upon actual 70-foot railway coach, scaled down at rate of 4 millimeters to foot. Details show how bolster of truck is fastened to floor of coach with single bolt, and how built-up roof fits into the cardboard sides.



Model railroad systems in 00-gauge, using tracks but three-fourths inch wide, can be laid out on an ordinary table. H. T. Nieter, American model engineer, shows here just how easy it is to build an 00-gauge 70-foot railway coach.

by H. T. NIETER

WITHIN the last few years the 00-gauge for model railroads has attracted the attention of many who, because of space limitations in their homes, could not build standard 0-gauge equipment. With tracks only ¾" wide, an entire system including stations, tunnels, bridges, and semaphores can be set up on a dining room table, or mounted on sections of wallboard which are easily folded up and packed away in a closet.

The American gauge or width of ¾" is used for the tracks in this project, this being closer to the gauge width obtained from the 4 millimeter to the foot scale than the ⅝" gauge used by English model builders.

With scale disposed of, the actual construction of the coach may be begun. The materials specified here are the simplest to handle, and are obtainable at a minimum of cost.

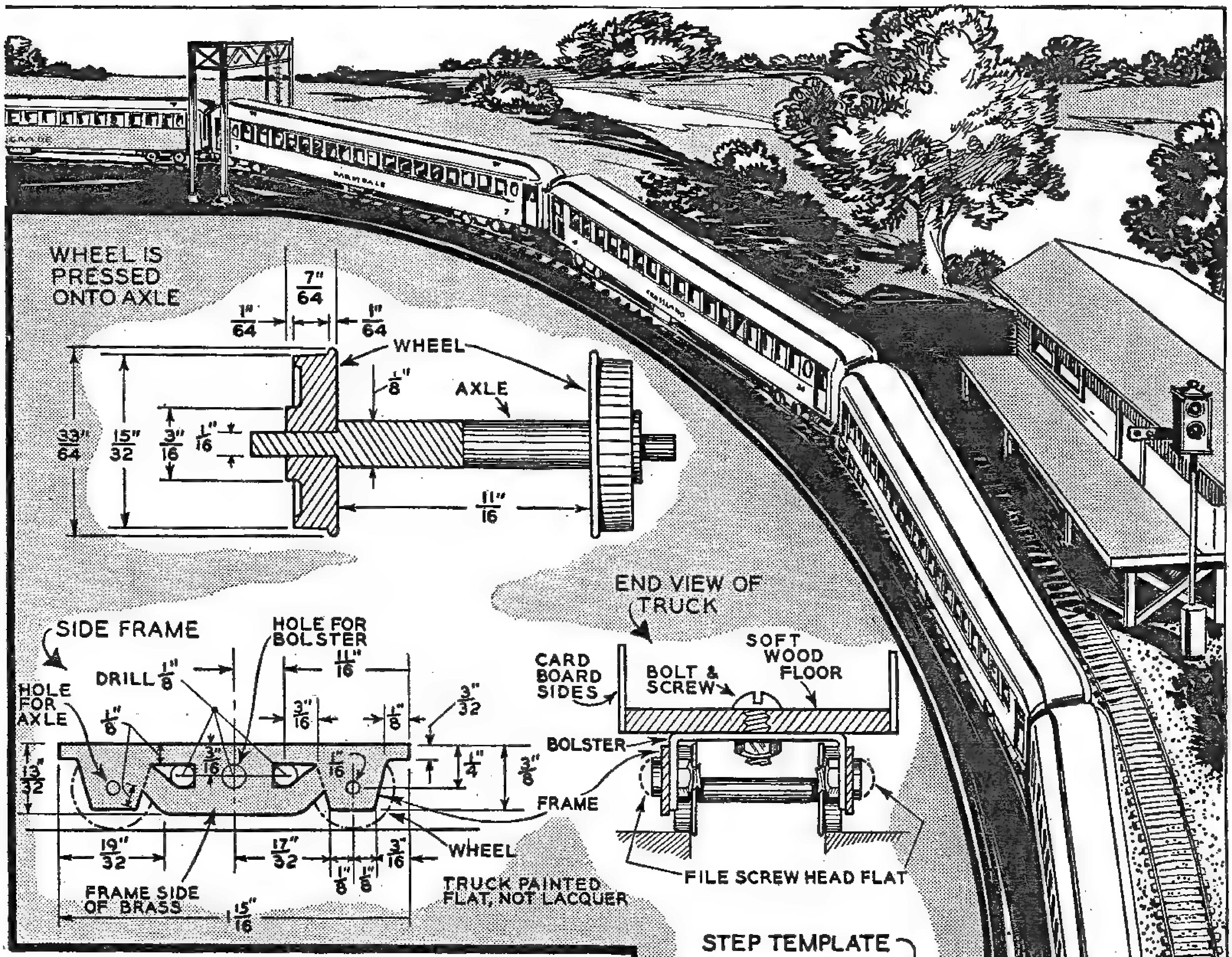
The floor is cut from a piece of ⅛" thick soft wood. Mark each side at a point ⅛" from the end, then bevel the corners as shown, leaving a 17/32" flat section for the vestibule.

Locate and drill holes for the truck centers, then cut out the ½"x½" squares on each end for the steps.

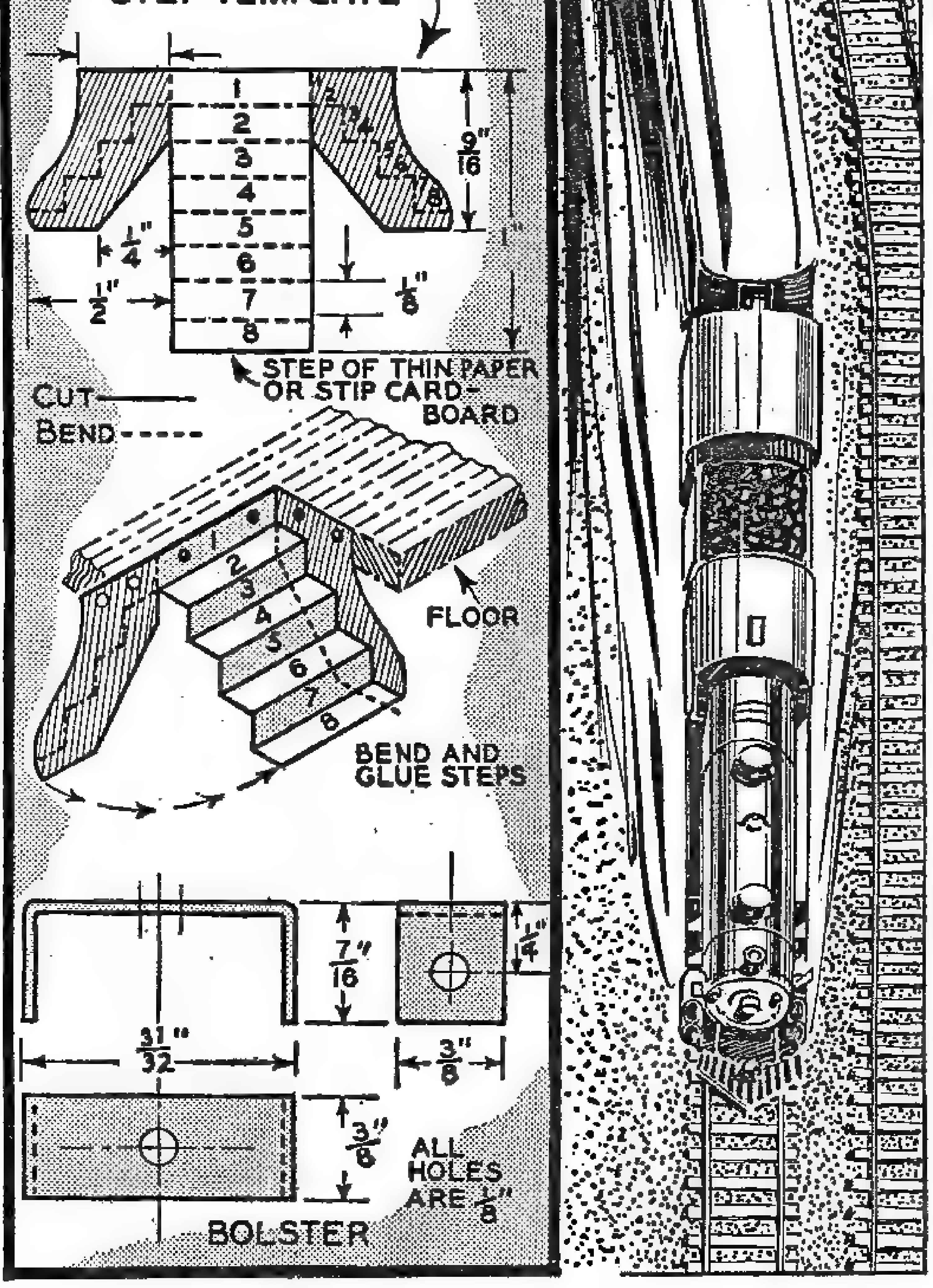
The sides of the car will require 1/32" cardboard similar to that used by laundries as shirt-stiffeners. One side and end may be cut in a single piece, or the entire side of the car cut at once. Add a ⅛" tab wherever the cardboard ends are glued together.

Following the dimensions on the drawing, mark out the windows and doors on the cardboard strips, starting at the center of a section and working toward the ends.

for Your Table Top Railway


WHEEL IS PRESSED ONTO AXLE
7"/64
1"/64
1"/64
WHEEL
1"/8
AXLE
33"/64
15"/32
3"/16
1"/16
11"/16
END VIEW OF TRUCK
SIDE FRAME
HOLE FOR BOLSTER
DRILL 1"/8
11"/16
HOLE FOR AXLE
1"/8
3"/16
1"/8
3"/32
3"/16
1"/16
1"/4
3"/8
13"/32
19"/32
17"/32
3"/16
1"/8
1"/8
WHEEL
FRAME SIDE OF BRASS
1 15"/16
TRUCK PAINTED FLAT, NOT LACQUER
CARD BOARD SIDES
BOLT & SCREW
SOFT WOOD FLOOR
BOLSTER
FRAME
FILE SCREW HEAD FLAT

Above details show construction of truck for 00-gauge coach. While brass is preferable, any other available metal may be used. When train is in use, bearings should be kept well-oiled to reduce friction. Lay out full size template for steps to dimensions shown at right, then trace out number needed. Make up four or five coaches for each engine used.


STEP TEMPLATE
1
2
3
4
5
6
7
8
9"/16
1"/4
1"/2
1"/8
1"
CUT
BEND
STEP OF THIN PAPER OR STIP CARD-BOARD
FLOOR
BEND AND GLUE STEPS
7"/16
1"/4
31"/32
3"/8
3"/8
ALL HOLES ARE 1"/8
BOLSTER

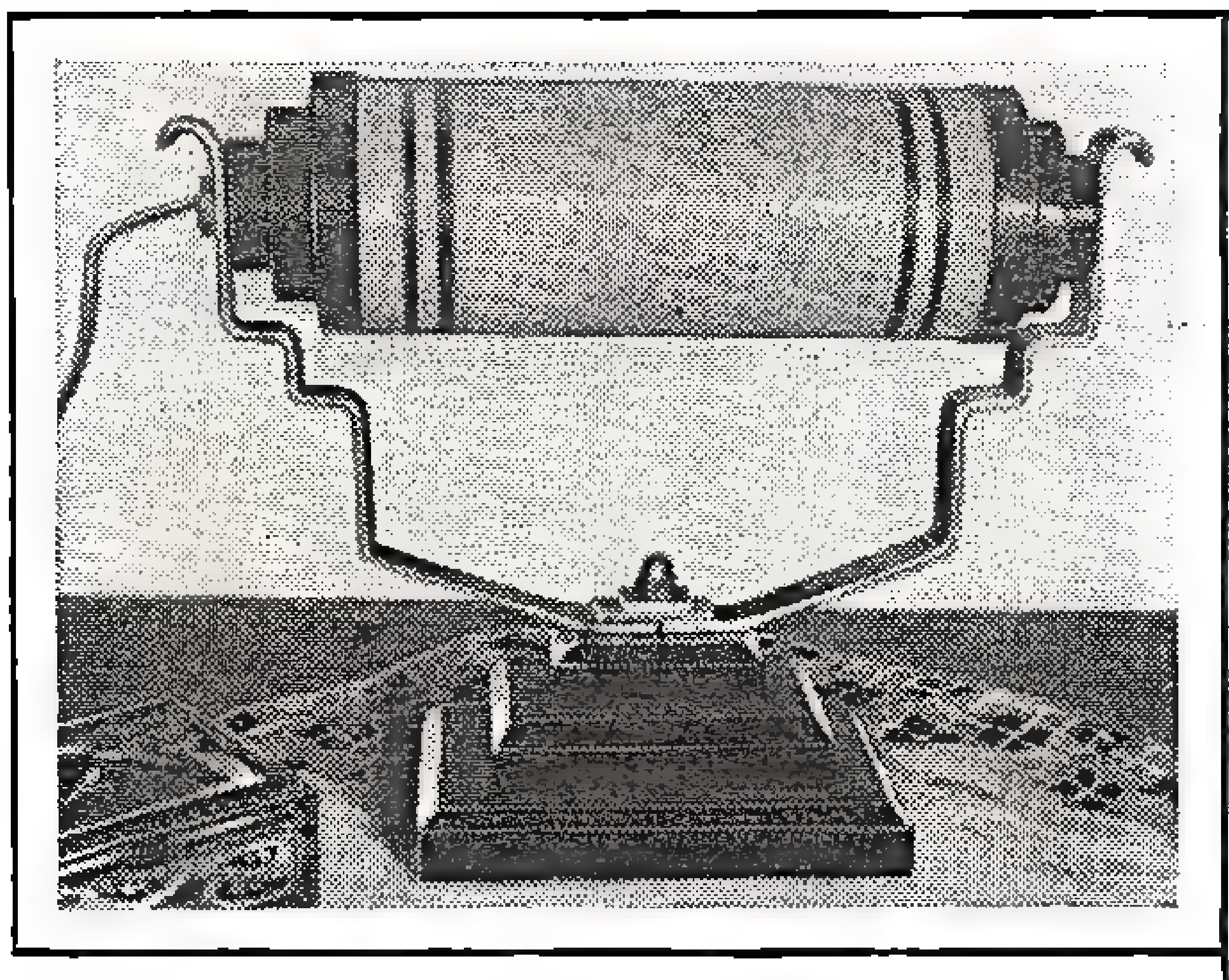
Cut out the windows in the sides and doors with a razor-blade or sharp knife. At the side doors, recess the card by cutting half-way through from the outside and peeling the layer to give the panel effect of a door that doesn't come flush with the rest of the side.

With the floor on a flat surface, and with its edges coated with glue, stand the sides up, one at a time, against it, pressing them tightly. They may be fastened in place with very small pins until the glue has set. Tie a string around the body now, and let it dry.

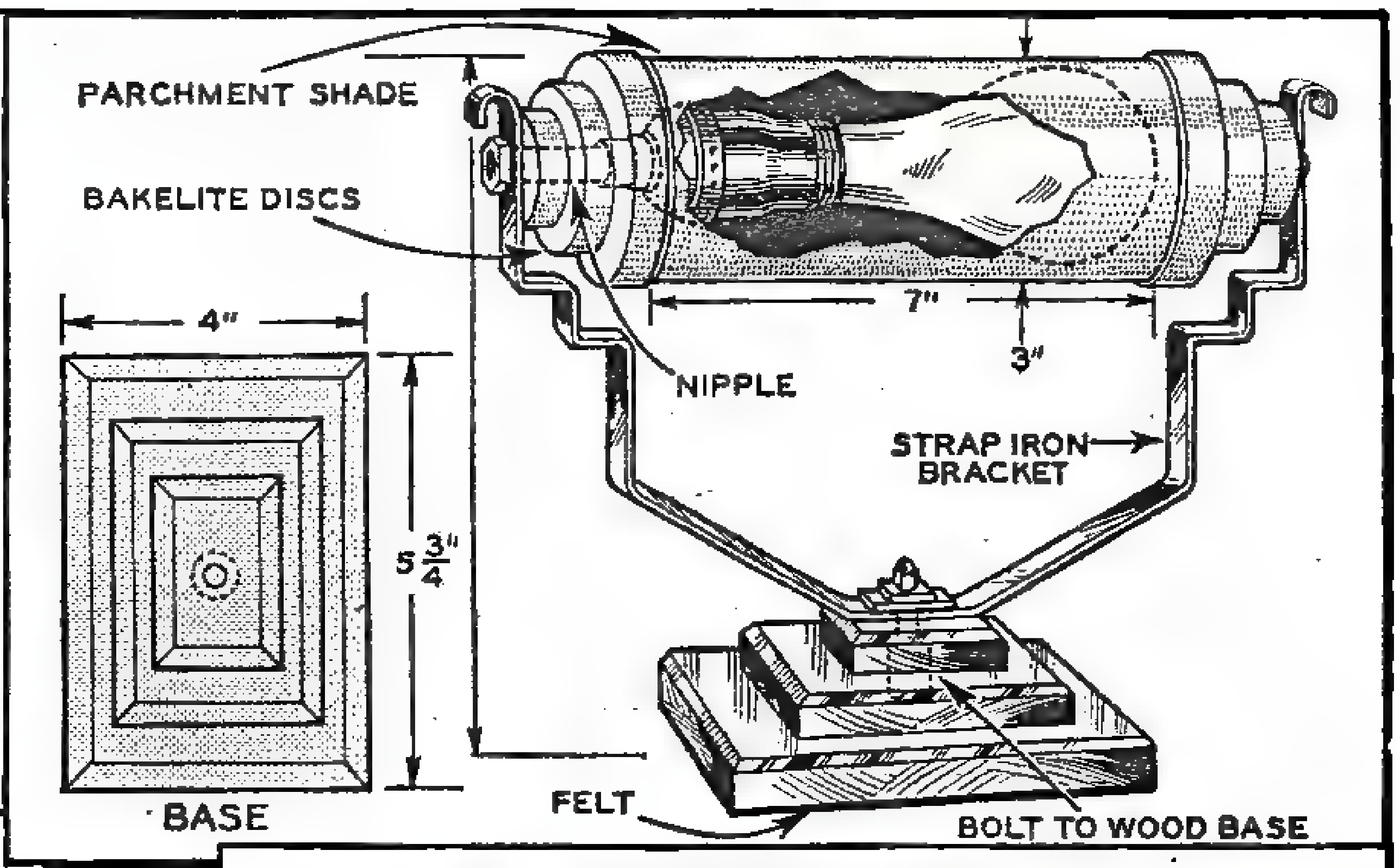
Although the roof may be purchased as a moulding, make your own if you want by a "bread-and-butter" construction borrowed from the model ship-builders. For this, three pieces 10 49/64" long will be needed; the top one to be 1 5/32" wide by 3/16" thick, the middle one 1 17/32" by ⅛", and the bottom, which fits inside the

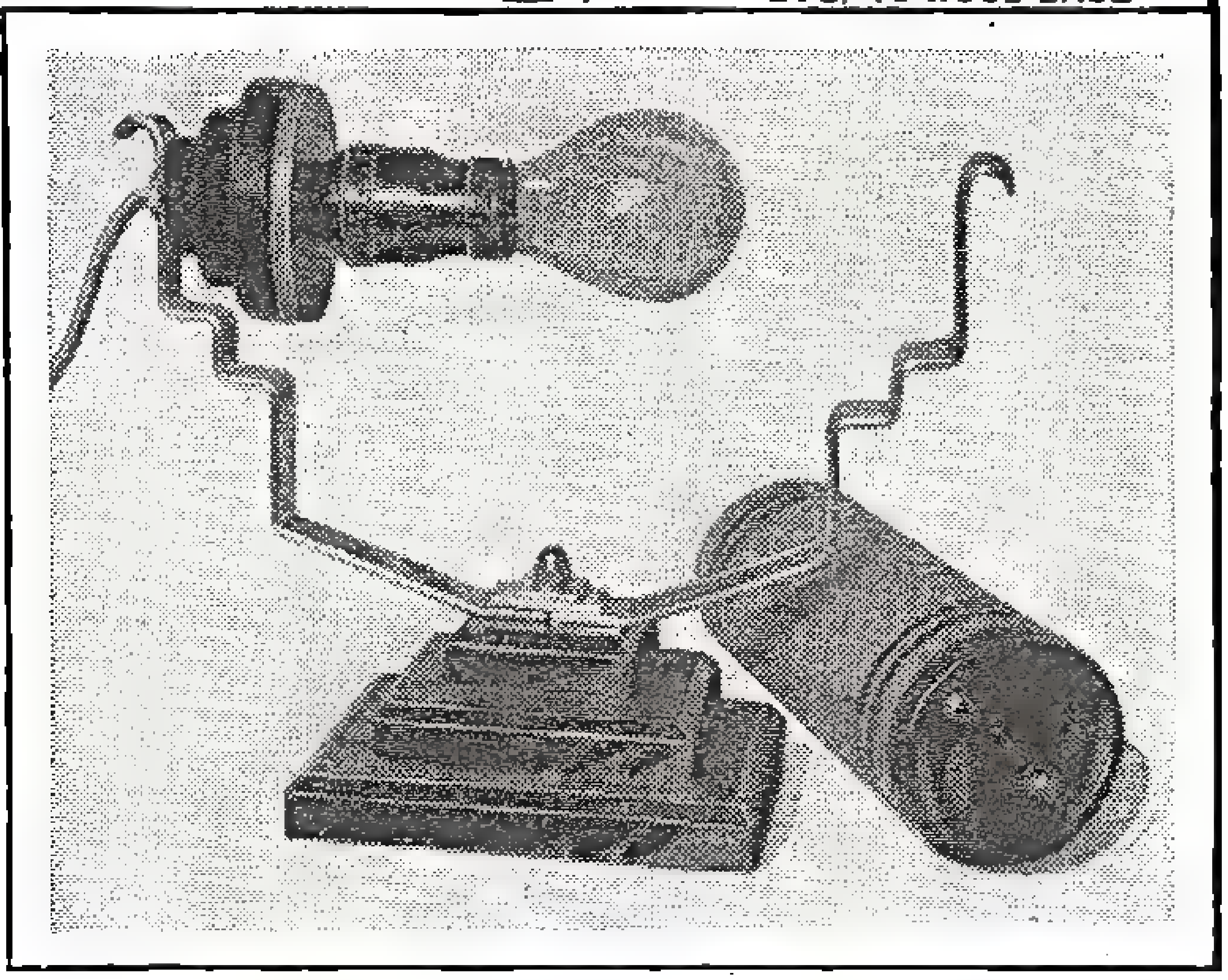
(Continued on page 120)

Radio Lamp in Modernistic Design Gives Subdued Light



Modernistic yet simple in design is this completed radio lamp with decorated parchment shade, aluminum brackets.





Dimensions of base and assembly of lamp are shown by sketches above, photograph below. Bulb should not be larger than 40 watts. Glue felt to wood base, after finishing in jet black enamel. Glue bakelite disc into one end of shade.

LENDING itself readily to almost any furniture design, this modernistically designed electric lamp provides striking but subdued illumination for the radio or highboy.

Oak or gum wood will be found best for the base pieces, which are held together by wood screws. Cut a set of discs with the diameters indicated from white pine for each end of the shade. Bakelite or wood discs are used as shade supports.

The two 10″ long bracket pieces are cut from ⅛″ aluminum, ¾″ wide. If strap iron is used, it should be given a coat of aluminum paint after bending.

The shade is a piece of parchment paper 7″x9⅜″, rolled into a 7″ long cylinder and held together with paper binding tape. Four narrow pieces of black binding tape are glued near the ends to make up the design, and the entire shade then given a thin coat of water glass.

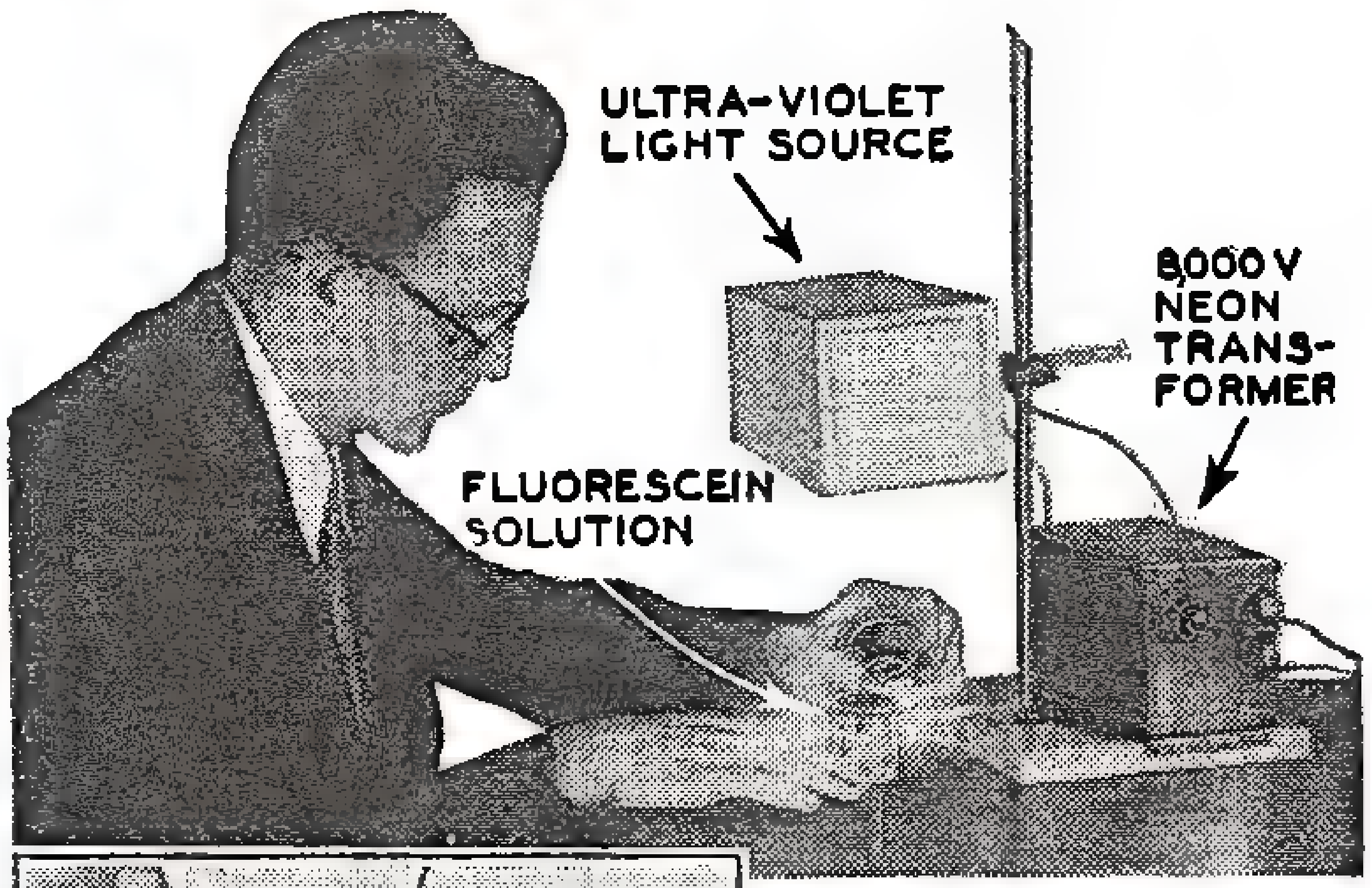
Stunts With Ultra-Violet Light

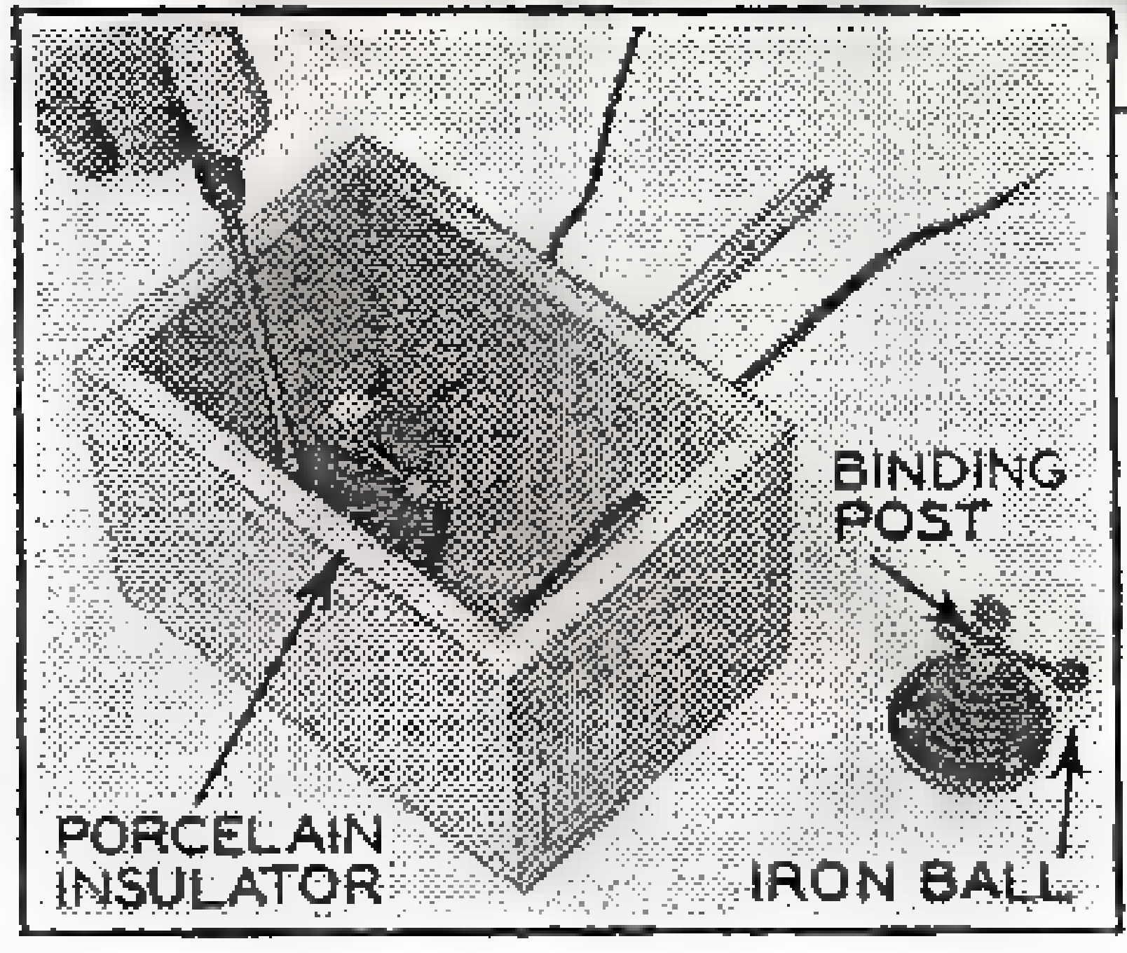
BY PASSING a high-voltage spark between iron electrodes, a source of light rich in ultra-violet rays is available for staging beautiful exhibits with invisible light.

Iron balls are fitted to the ends of two short metal rods, and these in turn mounted in the binding posts of bee-hive type insulators. The spacing between electrodes is adjusted after they are mounted in a wood box, until a spark coil or 8000 volt neon sign transformer will spark across the gap.

In a darkened room strikingly beautiful effects are produced when various substances are held under the iron gap. A tablet containing quinine, dissolved in a little acidulated water, glows with a blue fluorescence. A solution of fluorescein poured from glass to glass gives a vivid effect, while uranium chemicals, anthracene powder, luminous paint, and dyes also glow.

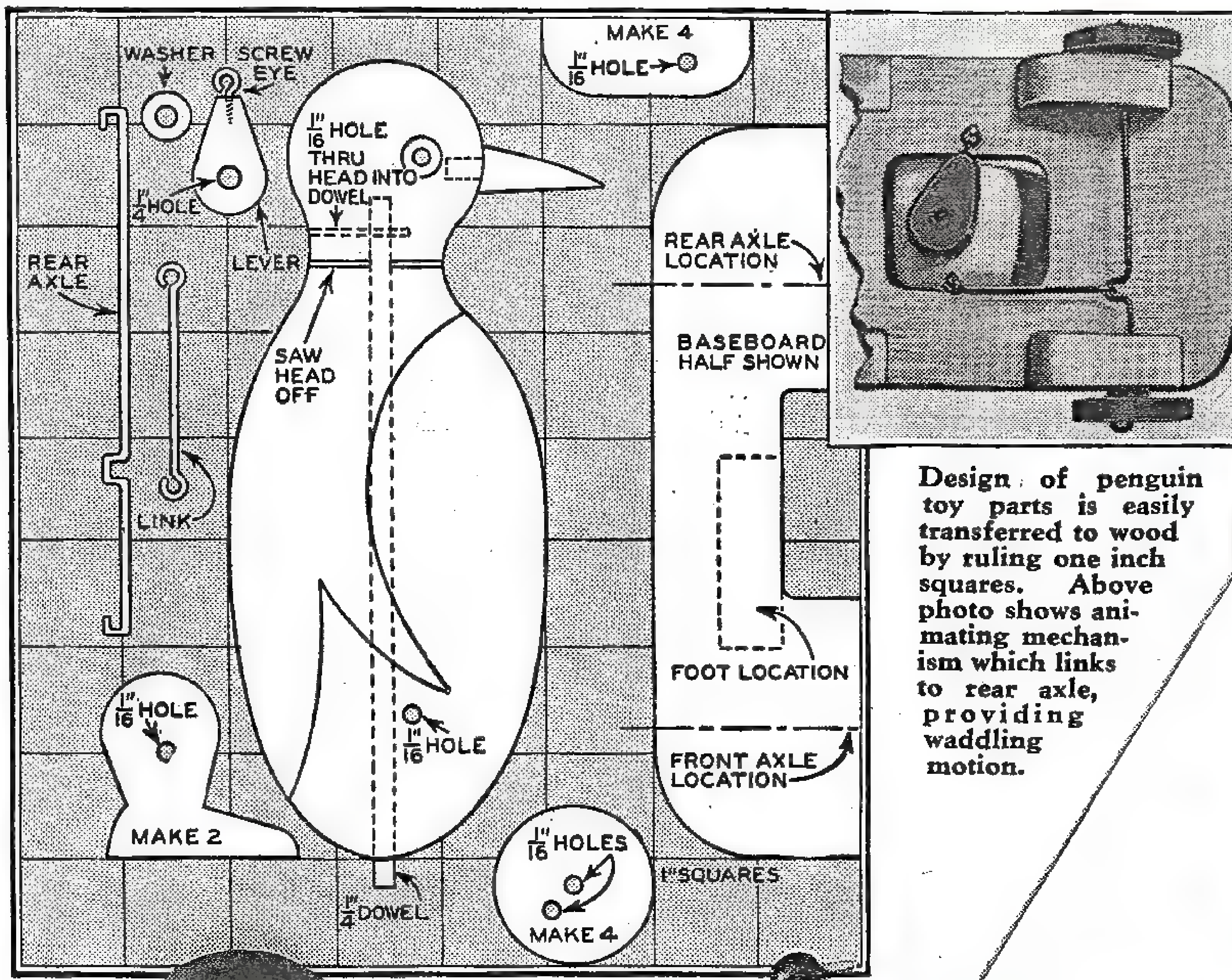
By placing a sheet of window glass between the spark and some glowing object, the opaqueness of ordinary glass to ultra-violet rays is at once seen. Uranium glass used for green dishes glows vividly.





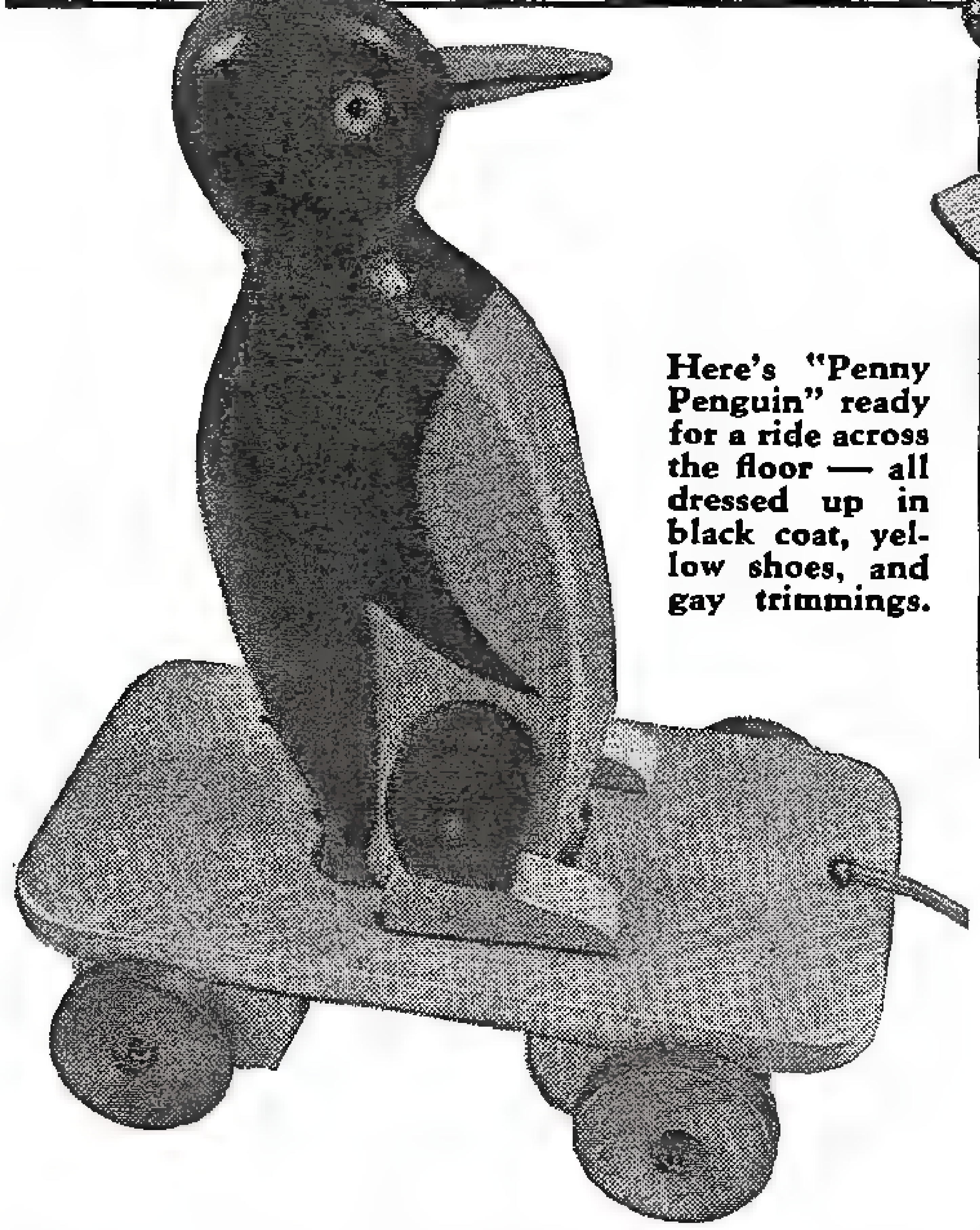
Either neon sign transformer or auto ignition spark coil may be used with iron ball spark gap as source of invisible or ultra-violet light for fluorescence experiments. Fluorescein solution gives off strikingly beautiful radiance when poured from glass to glass under light.

"Waddling Penguin" Toy Amuses Children

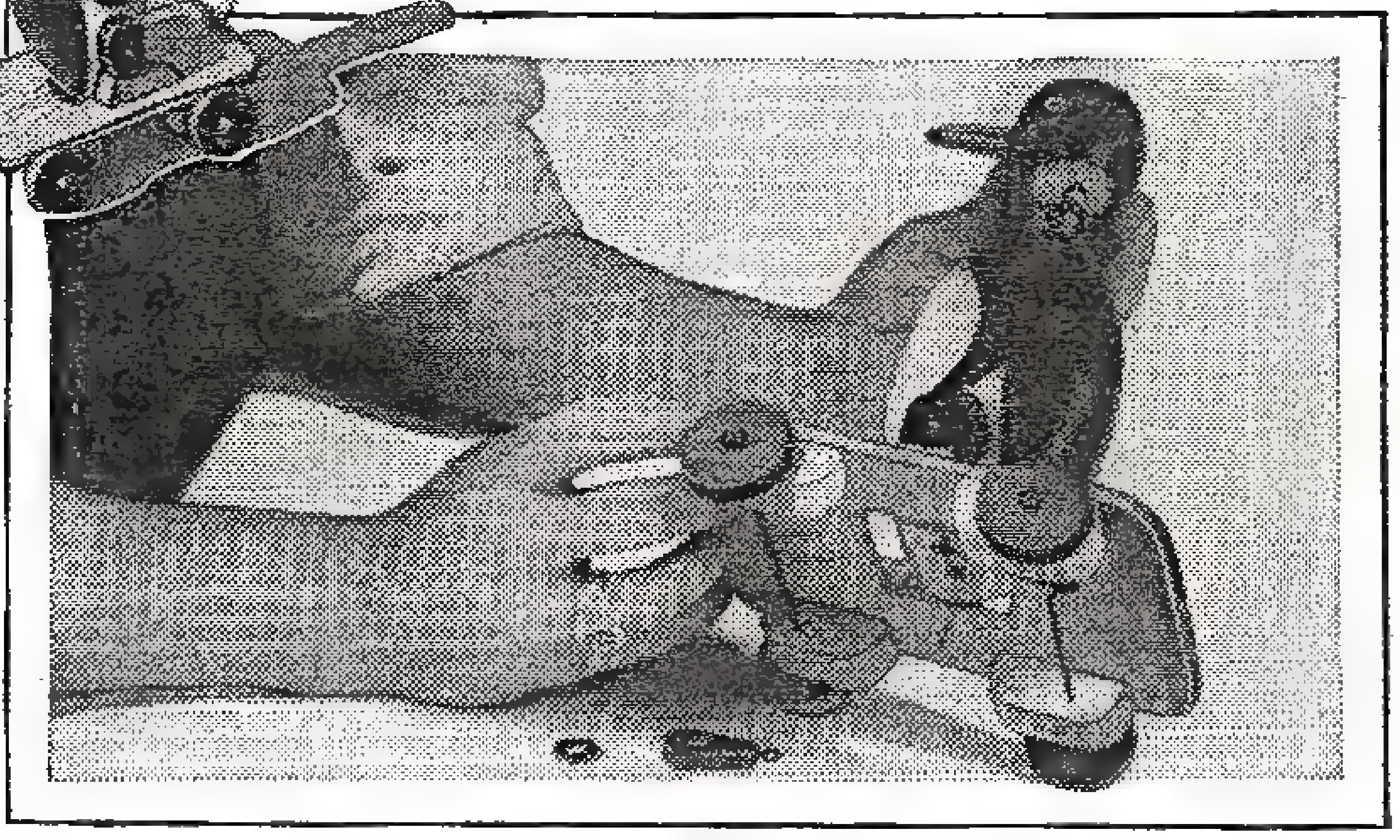

WASHER
SCREW EYE
1/4" HOLE
LEVER
REAR AXLE
LINK
1/16" HOLE THRU HEAD INTO DOWEL
SAW HEAD OFF
1/16" HOLE
MAKE 2
1/4" DOWEL
MAKE 4
1/16" HOLE
1/16" HOLES
MAKE 4
1" SQUARES
REAR AXLE LOCATION
BASEBOARD HALF SHOWN
FOOT LOCATION
FRONT AXLE LOCATION

Design of penguin toy parts is easily transferred to wood by ruling one inch squares. Above photo shows animating mechanism which links to rear axle, providing waddling motion.

"Penny" sways back and forth, rolls his head wisely, with varying speed.



Here's "Penny Penguin" ready for a ride across the floor — all dressed up in black coat, yellow shoes, and gay trimmings.



Adjust wheel bearings carefully to keep friction at minimum. Loop axles back through off-center holes in wheels.

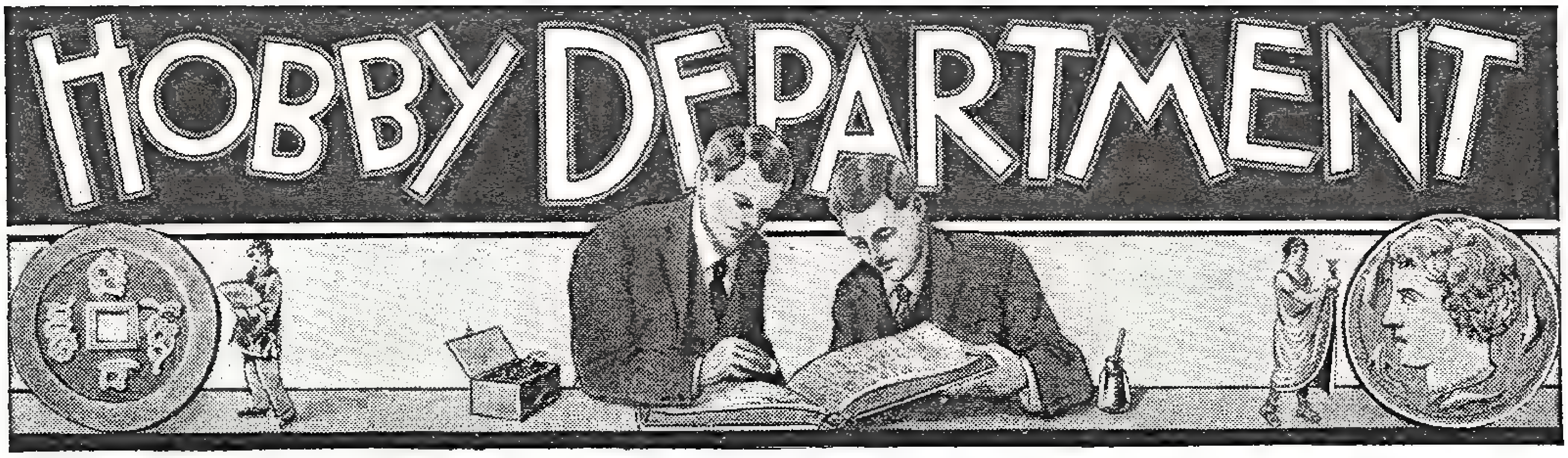
WITH mirth-provoking dignity "Penny Penguin" rolls his owlish head from side to side, waddles back and forth as he is pulled across the floor. "Penny" is a toy, very easy to build, yet a source of lasting pleasure to the child who receives him in the Christmas stocking.

From a selected piece of white pine cut out the head and body in one piece on the band saw. Round off the edges of the body, either on a lathe or with a half-round wood rasp, and sand down until smooth.

Now drill a 5/16" hole through the body and partly into the head. Cut off the head, then glue a 6¾" piece of ¼" dowel rod into it.

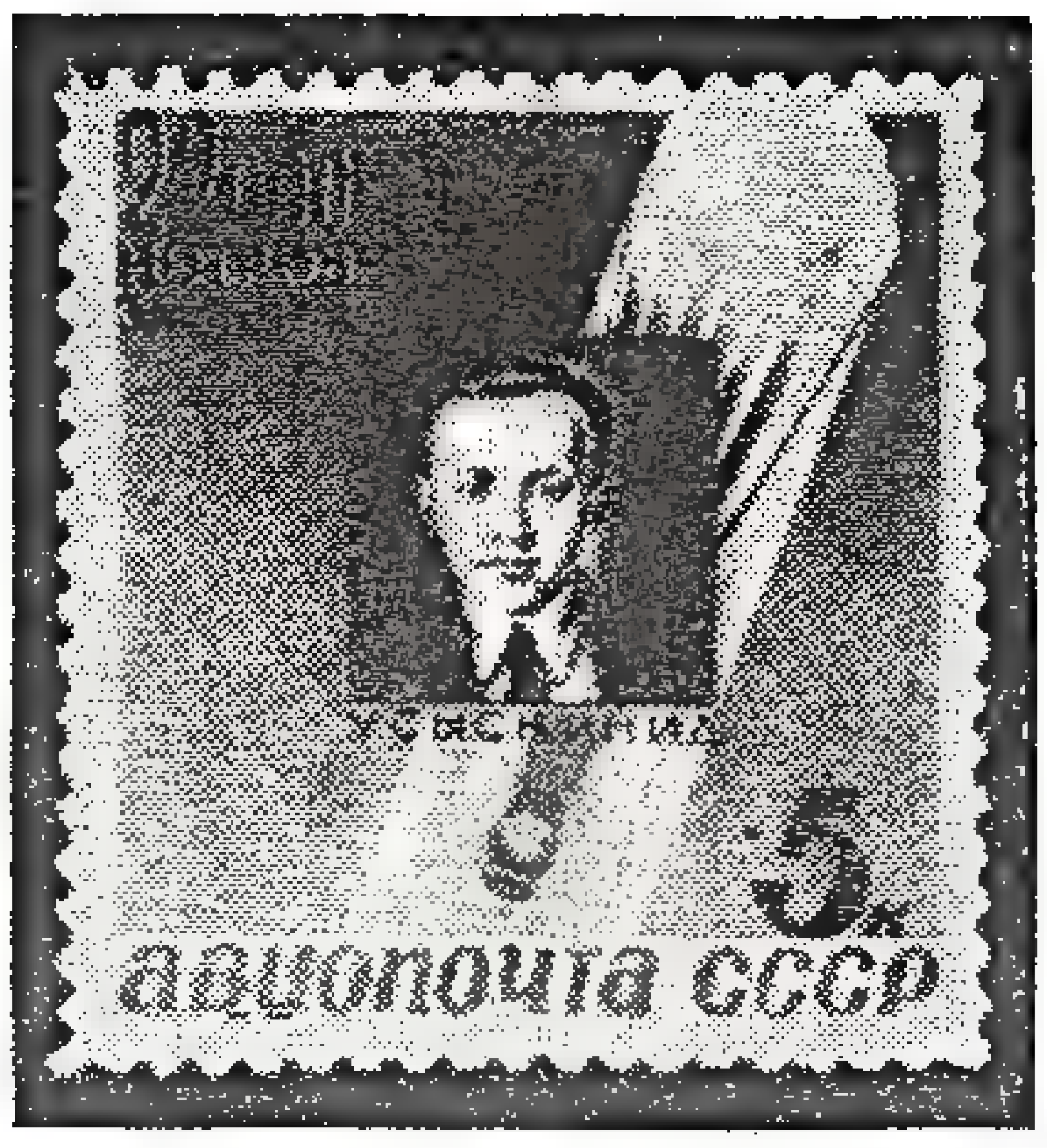
After cutting out the feet, base, and wheels, parts are glued and nailed together as indicated in the photographs. The lever which turns the head is glued to the bottom of the dowel rod. With one end of this lever anchored to the body by a screw-eye, the head automatically turns as the body sways back and forth. A wire connecting rod joins the crank on the rear axle to a screw-eye on the body.

With "Penny" working smoothly, give him a coat of shellac or wood filler, then dress him up with gay enamels. Black head, white eyes, yellow feet and beak, black coat, and white vest are suggestions.



HOBBY DEPARTMENT

Russia—Stratosphere Crash Issue

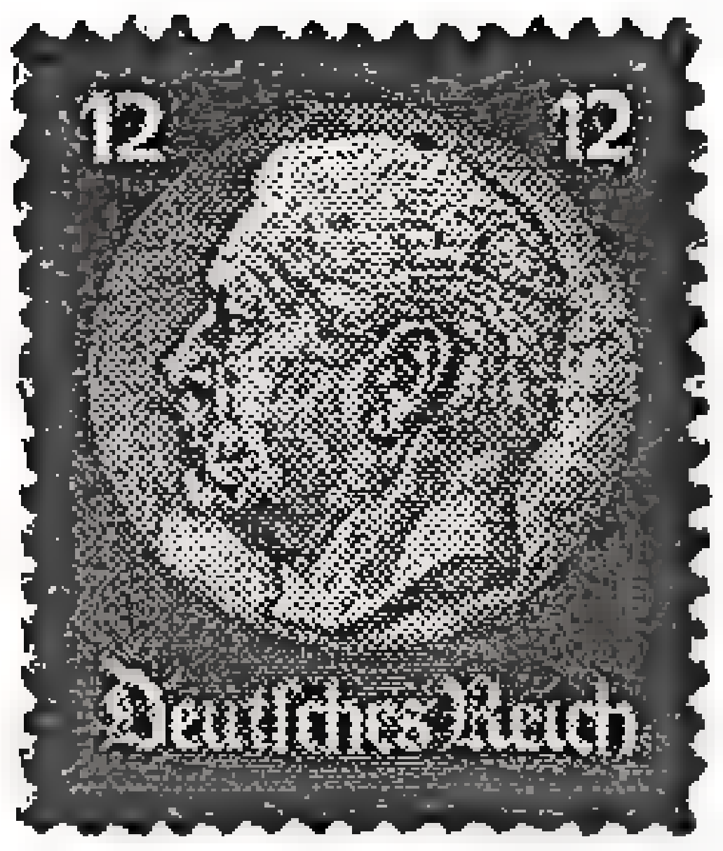


Russ stratosphere crash stamp.

SOVIET Russia honors, in a beautifully executed set of three stamps, the three youthful martyrs to science who crashed to their death on January 30, 1934, after ascending into the stratosphere to a height never before reached by man. Only the fact that all instruments were destroyed in the fateful descent and crash prevents their achievement from setting a new world's record.

The central design of each stamp is a portrait of one of the balloonists. Stripped across the background is the partly inflated stratosphere balloon.

Germany—Hindenburg Death



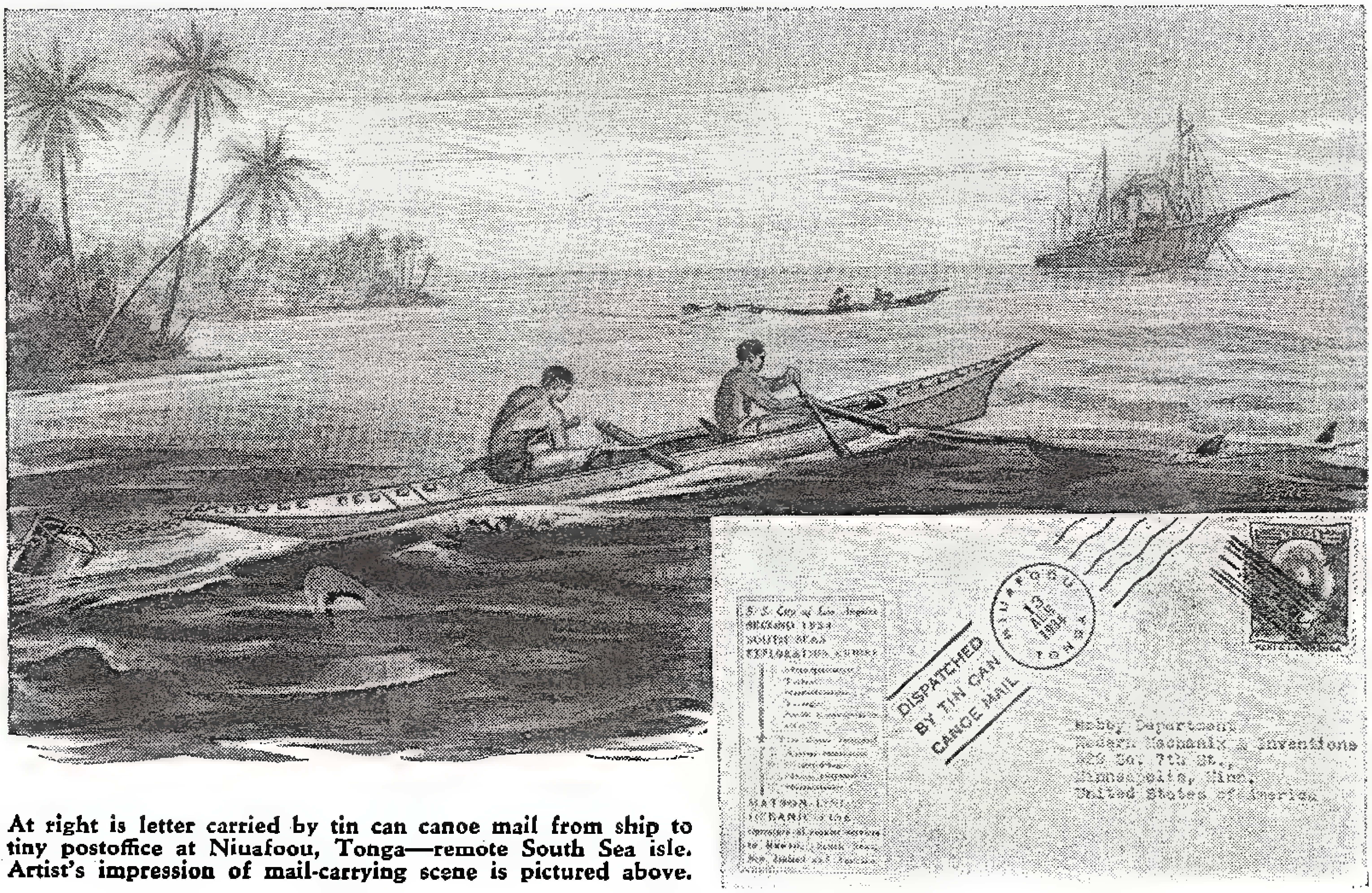
Black border was printed on Hindenburg stamp after his death in August.

BLACK borders appearing on six of the recently issued Hindenburg medallion stamps mark the passing of Germany's beloved president—of the man whom even France, bitterest enemy during World War days, respected and honored. Stamps were run through the presses a second time.

Tonga—Tin Can Canoe Mail

TIN CAN ISLAND, remote isle of the Tonga group in the South Seas, still gets its mail in sealed tin cans, but not in the picturesque swimming postman fashion of a year or so ago. With no harbor or landing place, it became necessary to seal the letters in tin cans, lash them to logs, and throw them into

(Continued on page 116)



Hobby Department
Modern Mechanix & Inventions
529 So. 7th St.,
Minneapolis, Minn.
United States of America

At right is letter carried by tin can canoe mail from ship to tiny postoffice at Niuafoou, Tonga—remote South Sea isle. Artist's impression of mail-carrying scene is pictured above.

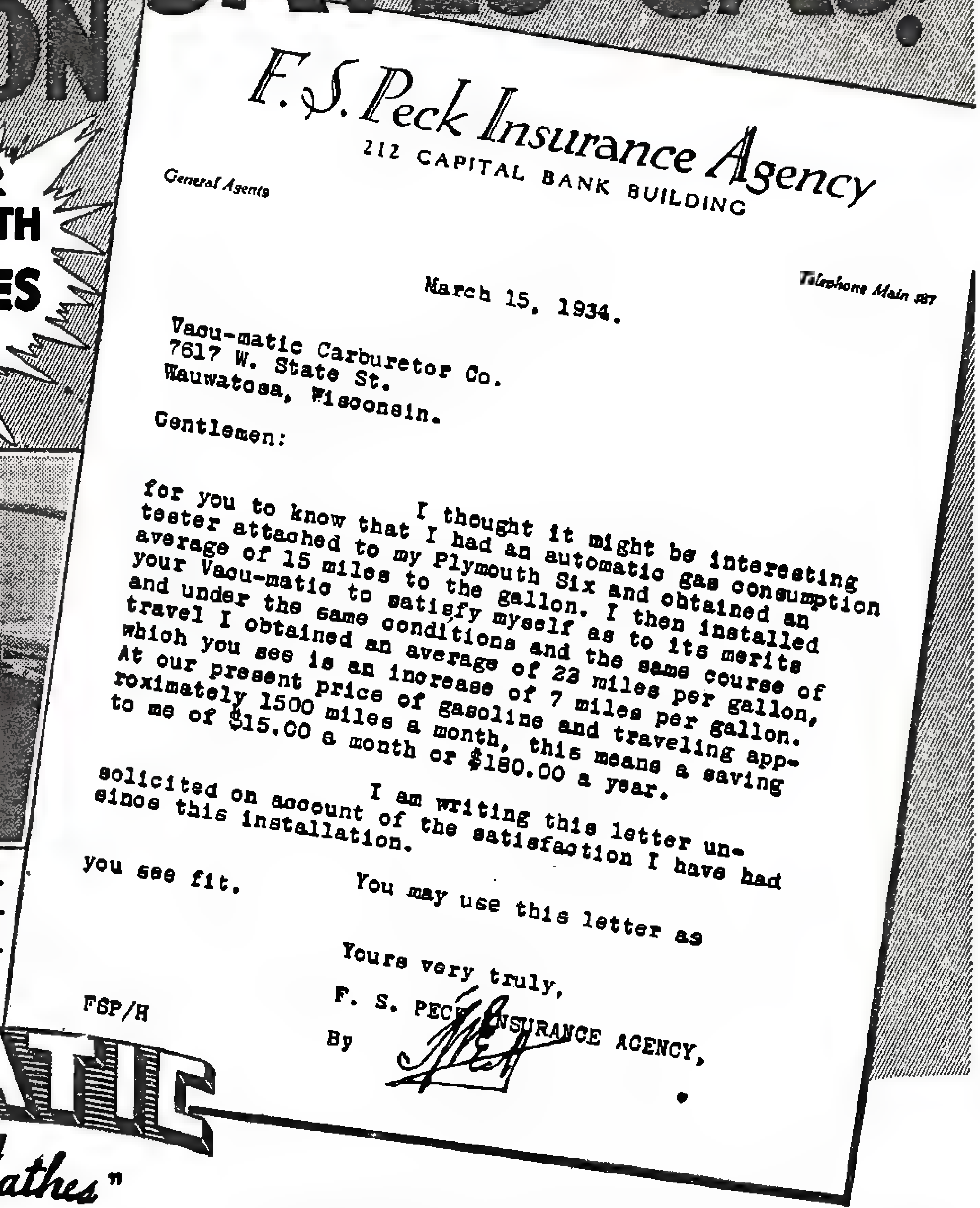
New INVENTION SAVES GAS!

7 MILES MORE PER GALLON on PLYMOUTH

MOTORIST SAVES $180.00 a YEAR

Saves up to Thirty Per Cent On Gas. Provides Faster Pick-Up—More Power—Greater Mileage and Smoother Running.

GET FREE INFORMATION



F. S. Peck Insurance Agency
212 CAPITAL BANK BUILDING
General Agents
Telephone Main 387

March 15, 1934.

Vacu-matic Carburetor Co.
7617 W. State St.
Wauwatosa, Wisconsin.

Gentlemen:

I thought it might be interesting for you to know that I had an automatic gas consumption tester attached to my Plymouth Six and obtained an average of 15 miles to the gallon. I then installed your Vacu-matic to satisfy myself as to its merits and under the same conditions and the same course of travel I obtained an average of 22 miles per gallon, which you see is an increase of 7 miles per gallon. At our present price of gasoline and traveling approximately 1500 miles a month, this means a saving to me of $15.00 a month or $180.00 a year.

I am writing this letter unsolicited on account of the satisfaction I have had since this installation. You may use this letter as you see fit.

Yours very truly,
F. S. PECK INSURANCE AGENCY,
By

FSP/H

* The above letter from California is unsolicited, and is just one of the many letters received from enthusiastic users.

VACU-MATIC

the Carburetor Control that "Breathes"

PATENT PENDING

AT LAST! Automotive engineers have smashed down the barriers to perfected combustion! The new VACU-MATIC solves the secret of greater power! With almost magical action, this amazing invention instantly puts new life and pep in any motor. It adds mileage to every gallon of gasoline . . . produces split-second pick-up, sensitive accelerator response, greater speed and smoother running . . . unfolding a new driving thrill for you!

Entirely New — Nothing Like It!

The self-starter—four wheel brakes—knee action—streamlining . . . and now VACU-MATIC! The greatest motor improvement of recent years! With it, engineers have achieved a practical means of AUTOMATICALLY balancing air and gasoline in correct proportions for ALL speeds! Functioning directly with the manifold vacuum, VACU-MATIC actually "breathes" when needed, giving your motor correct combustion. Sharply cuts fuel wastes, saves dollars in gas costs, reduces carbon and gives your engine new pep, greater power and longer life.

Agents and Salesmen

If you are interested in earning up to $15 daily, check coupon. Exclusive territories now being granted.

Fits All Cars

VACU-MATIC is constructed of six parts, electrically welded into one unit, correctly adjusted and sealed at the factory. Nothing to regulate. Any motorist can attach VACU-MATIC in ten minutes. Once in, its only reminder is the surge of instant power and the speed it gives to the motor and the savings it affords your pocketbook.

The VACU-MATIC Co., Wauwatosa, Wis.

Guaranteed Gas Savings

The VACU-MATIC proves itself on every car. It is guaranteed to give worth-while gas savings, quicker pick-up, and more power or it costs you nothing. "On a test I gained an average of 4 miles on a gallon," writes Alex Wertz. "Vacu-matic is the best I have ever tried." Clarence Rutzin—"I have tried the Vacu-matic on several tests and find that I get between 5 and 6 miles per gallon increase, have more mileage, have greater pickup."

Free Details

Learn about this remarkable device that so greatly affects the entire performance of your motor. Learn why your car is costing you extra money to operate without VACU-MATIC. See why your VACU-MATIC equipped car will leap away from traffic without sputter or hesitation. Discover a new driving thrill and enjoy the savings that more than offsets VACU-MATIC's slight cost. Get the facts! Write today!

FREE OFFER COUPON

THE VACU-MATIC COMPANY
7617-65 W. State St., Wauwatosa, Wis.

Gentlemen: Please send me full particulars concerning the Vacu-matic and details of your Free Offer. This of course does not obligate me in any way.

Name..

Address..

City.................................... State....................

☐ Check here if interested in selling proposition.

Chicago Fair—Last Day Covers

AS THE Century of Progress exposition closed its gates officially for the last time at midnight, October 31, thousands of letters sent in by collectors were being given the last day, last hour official cancellation at the two World's Fair postoffices. Colored closing day cachets were also applied.

ADLETS FOR HOBBYISTS

STAMPS

STAMPS Sent on approval. 50% discount. Fred Herzberg, 197 Grantley Ave., Elmhurst, Illinois.

FREE!!! Oriental Packet and Pocket Album, 5c with approvals. Hollystamp, 1710 North Vermont, Hollywood, California.

CAICOS ISLANDS—Also early United States, Uganda, Congo's, Nicaragua, Monte Carlo, Niger Coast, Canada, Newfoundland, and Ubangi — "Countries Collectors Haven't Got" — Free for 5c postage. Hurry for yours, Now. Empire Stamp Company, Dept. MM., Toronto, Canada.

STAMPS! 100 diff. 2c; 500 diff. 35c; 1,000 diff. 90c. Tatham Stampco, D9, West Springfield, Massachusetts.

SENSATIONAL Packet: Coreas, Liberia, triangles, British Colonials 10c. A. Steele, Springdale, Pa.

HEADQUARTERS—Stamp Collectors! Penny Approvals, Lowprice Sets. Request selection. Elyria Stamp Company, 437MM, Elyria, Ohio.

105 DIFFERENT, Hyderabad, Congo, Guinea, etc., 3c to approval applicants. Extra—Airmail Set Free with above. Hunzimker, Box 225, Minneapolis, Minn.

FREE!!! Russia Ethnographic set or three Spain Airmails. Postage 3c. Roberts, 901T Fourth, Baycity, Mich.

LOOK! Gorgeous packet including Uruguay (Flying Horse) Airmail, Spanish Airpost, Triangle and ship stamps, only 5c to approval applicants. Royale Stampco, South Pasadena, Calif.

1000 OLD Mixed Stamps 25c. Smith Bros., Bamlet Road, Royal Oak, Mich.

TRADE or Swap Your Duplicates! Popular New Method. Write today for Free information. World Wide Packet Exchange, Box 745-M, Beverly Hills, California.

SPANISH Ships and 50 different, 3c with approvals. Tupper, Federal St., No. Wilmington, Mass.

COINS

HIGHEST Prices paid for Indian Head Pennies. Send dime for list of those wanted. Coin Shoppe, Box 407-MM, Ottawa, Ill.

UP TO $50.00 paid for Indian Head Cents, Half Cents $250.00; Large Cents $2,000.00, etc. Send dime for list. Romanocoinshop, Dept. 277, Springfield, Mass.

TOP Prices Paid for Indian Head Pennies. Send dime for catalog of coins wanted. The Coinmart, B-56 West Washington St., Chicago.

$5 to $500 EACH paid for Old Coins. Keep all old money. Get posted at once. Send 10 cents for Illustrated Coin Value Book 4x6. Guaranteed Buying and Selling Prices. Coin Exchange, Box 17, Le Roy, N. Y.

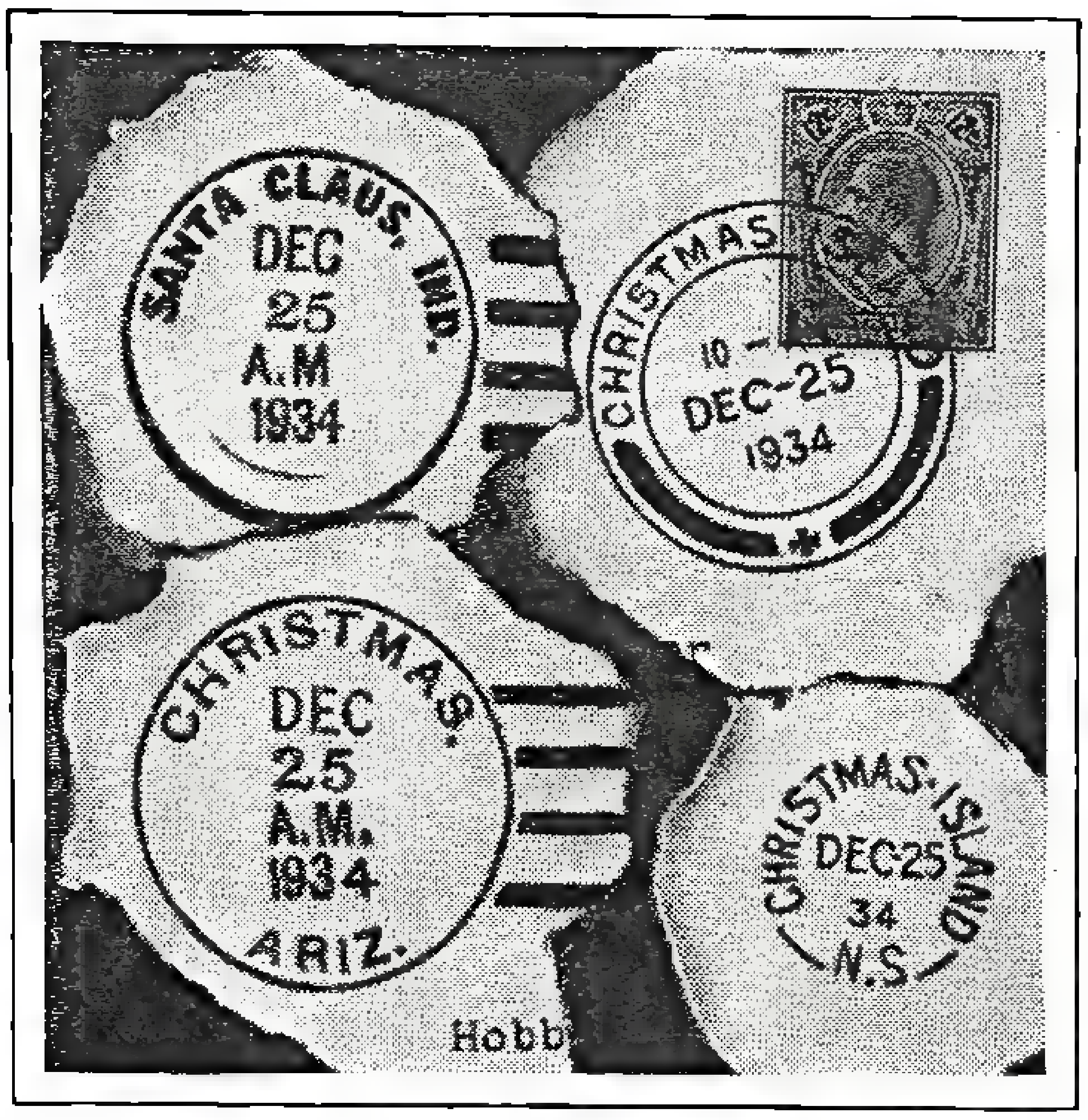
FREE—Foreign coin, banknote, and large illustrated coin catalogue—4c postage, Souvenir California gold quarter size 26c; $½ size 53c; both 65c! Round or octagon, set of each $1.30! Approvals with each order. Tatham Coinco, West Springfield—9, Mass.

WE BUY 1907 Indian Head Pennies. Send dime for prices. Bencoin, 206 Broad, Bennettsville, S. C.

OLD MONEY Wanted. $5.00 to $2,500.00 each paid for old coins. Buying catalog 10c. Robert Cohen, Box 483, Muskogee, Okla.

CALIFORNIA gold, quarter size 27c; $½ size 53c; 100 different stamps and catalogue coins & stamps 10c. Norman Shultz, Salt Lake, Utah.

Santa Claus Mail Goes to Indiana



Here are Christmas day postmarks which collectors can obtain for albums. Christmas Island cancellation on Straits Settlement stamp came from tiny isle in Indian ocean, 200 miles south of Java. Off west coast of Nova Scotia, Canada, is settlement from which "dime size" cancel was sent. (Dates were changed to Dec. 25, as shown, by staff artist.)

THERE is a Santa Claus town—but it's not at the North Pole! Each year holiday mail clerks route thousands of Santa letters, dropped into corner mailboxes by hopeful little fingers, to the little-known town of Santa Claus, in Indiana. There, after the holiday mail rush has dwindled away, the postmaster and his wife open each letter.

To this postmaster, too, come requests from parents, asking that letters addressed to their children be given the Santa Claus cancellation. Annually thousands of children thrill to genuine letters sent them by Santa—for who can doubt their authenticity when even the cancellation is correct.

A collection of Yuletide postmarks makes an interesting page in any album. December 25th cancellations can be obtained from the two U. S. Christmas towns—in Arizona and Florida, and from the three Christmas Islands in the world, by sending stamped, addressed letters with your requests to postmasters at the different places.

Tonga—Tin Can Canoe Mail

(Continued from page 114)

the water where natives would push them to shore. Hungry sharks so endangered the postal force of the island that canoes were provided for the postal force.

Normally W. G. Quensell, Postmaster, storekeeper, and copra trader at Niuafoou, receives about 200 letters a year. Since the shipping line serving this point has allowed stamp collectors to mail letters to themselves from this tiny postoffice, more than 15,000 letters were sent this year.

BOYS! THROW YOUR VOICE

Into a trunk, under the bed or anywhere. Lots of fun fooling teacher, policeman or friends.

THE VENTRILO

a little instrument, fits in the mouth out of sight, used with above for Bird Calls etc. Anyone can use it. **Never fails. A 64-page book on Ventriloquism and the Ventrilo. All for 10c Postpaid.**
JOHNSON SMITH & CO. Dept. 619 RACINE, WIS.

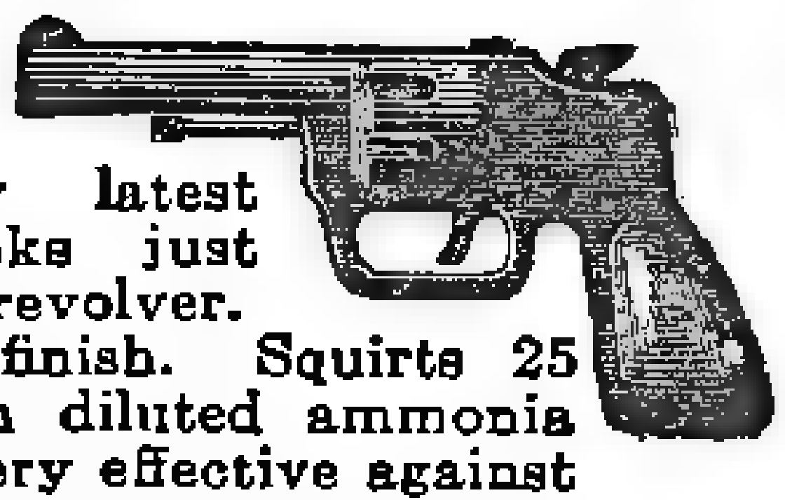
BOY AMATEUR ELECTRICIAN 10c

The HOW and WHY of electricity fully told in simple language that any boy can understand. Scores of plans and instructions for making—dry batteries, dynamos, electric motors, telegraph apparatus, telephones, electric lights, electric door bells, alarms, electric engine, rheostat, mail box alarm, electro-magnets, automatic incandescent flash, electric shocking machine, wireless telegraph apparatus, induction coil, arc light, current reverser, etc., etc. Tells all about electric wiring, static electricity, magnets and magnetism, conductors and insulators, electrostatic induction, electroscope, electrophorus, condensers, Leyden jar dynamic electricity, the voltaic cell, electromagnets, electrolysis, electro-plating, electrotyping, how to build a radio for a few cents, etc. 64 pages. 100 illustrations. **10c postpaid. JOHNSON SMITH & CO., Dept. 619, RACINE, WIS.**

MAKEYOUROWNRADIO

Enjoy the concerts, baseball games, market reports, latest news, etc. This copyrighted book "EFFICIENT RADIO SETS" shows how to make and operate inexpensive Radio Sets, the materials for which can be purchased for a mere trifle. Also tells how to build a short-wave Receiver for bringing in foreign stations, police calls, ships at sea, etc. **ONLY 15c p.pd.**

Daisy Water Pistol



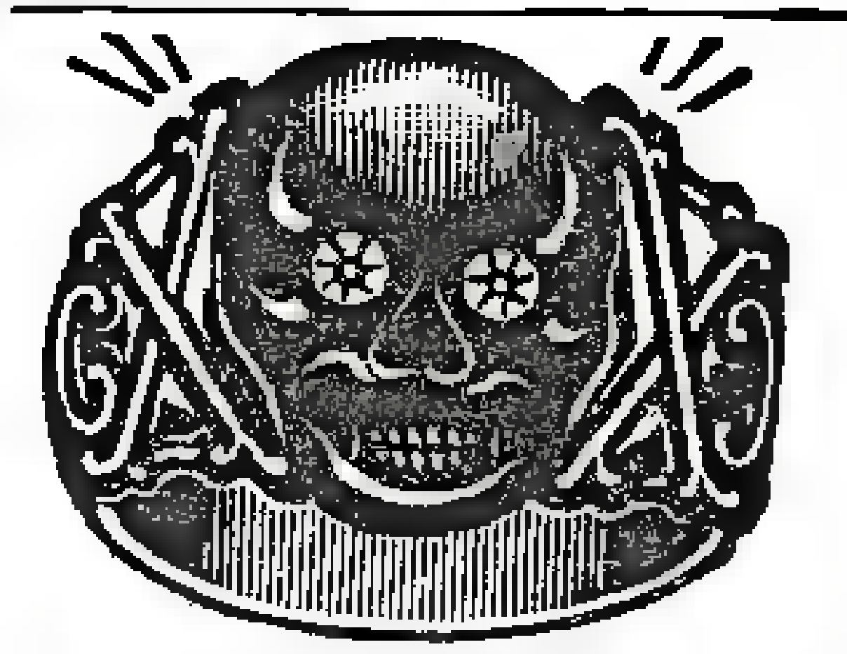
6-Shot Repeating Water Pistol—very latest design; looks just like a Police revolver. Blue steel finish. Squirts 25 feet. When diluted ammonia is used is very effective against vicious dogs, tramps, animals. 7 inches long. PRICE 25c POSTPAID.

Put PHOTOS on Silk, Cloth, Wood, Paper, Linen, etc. 25c

THIS EASY QUICK WAY

It is now easy to print your snapshots and other photos on any cloth or other fabric surface—cushions, pillows, handkerchiefs, scarfs, ties, hosiery, underwear, paper, wood, linen, etc. The photos are washable. Will not fade or rub off—long lasting. Easy to do. Just follow a few simple directions. One bottle is good for about 50 prints in RICH TONES. Thoroughly practical.

Price for Complete Outfit, only 25 cents postpaid.



Good Luck Ring 25c

Very striking, quaint and uncommon. Silver finish; skull and crossbones design, two brilliant, flashing gems sparkle out of the eyes. Said to bring good luck. **Only 25c ppd.**

MAGIC MADE EASY

250 Magic Tricks

An excellent little book containing nearly 300 tricks for parlor or stage that anyone can do. Tricks with cards, coins, handkerchiefs, eggs, bottles, string, etc. Also Second Sight, Shadowgraphy, etc. Profusely illustrated. **10c postpaid.**

125 CARD TRICKS and sleight of hand. Contains all the latest and best card tricks as performed by celebrated magicians, with exposure of card tricks used by professional gamblers. **Price 25c postpaid.**

SNAPPY JOKES. A splendid collection of rich and rare jokes, compiled by a jolly bartender for stag parties, smokers, etc. **10c.**

FORTUNE TELLING BY CARDS, dice, dominoes, crystal, etc. Gives meaning of every card, how to deal and lay them out, etc. **Price 10c postpaid.**

LEARN TO HYPNOTIZE. Book tells how to hypnotize, how to produce sleep, how to awaken a subject, medical hypnotism, hypnotism in diseases, how to hypnotize animals, etc. **Price 10c postpaid.**

STAR TOY MAKER

Greatest boys' book written. Tells how to make a Pinhole Camera, a Canoe, model Railroad, a Telephone, Boomerang, Telegraph Instrument, Box Kite, Talking Machine, Microscope, Electric Motor, Electric Door Bell, Water Wheel, Paddle Raft, a pair of Skis, a Dog Sled, Bird House, Rabbit Yard, etc. 54 pages. 150 illustrations. **PRICE 10c.**

MIDGET BIBLE. Size of a postage stamp. Over 200 pages. Remarkable curiosity. Said to bring good luck. **Price 15c postpaid.**

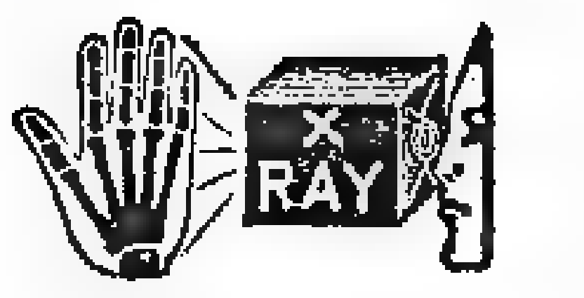
DREAM BOOK AND FORTUNE TELLER. Tell your own fortune. With dictionary of dreams and interpretations, lucky numbers, oracles, divinations, palmistry, etc. **10c.**

HOW TO TIE KNOTS. 32 page book tells how to make different knots, hitches, splices, etc. 100 illustrations. **Price 10c postpaid.**

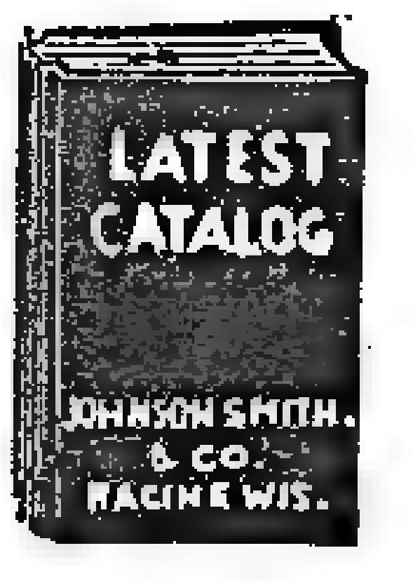
5-MINUTE HARMONICA COURSE. A new easy self-teaching method. Teaches how to play, to use the tongue, tremolo, fully illustrated. **Price 15c postpaid.**

LEARN TO DANCE. Book contains full instructions in old and new dances. Easily understood. **PRICE 25c.**

WONDERFUL X-RAY TUBE



A wonderful little instrument producing optical illusions both surprising and startling. With it you can see what is apparently the bones of your fingers, the lead in a lead pencil, the interior opening in a pipe stem, and many other similar illusions. Price, **10c, 3 for 25c, p.pd.**



LATEST CATALOG
JOHNSON SMITH & CO. RACINE WIS.

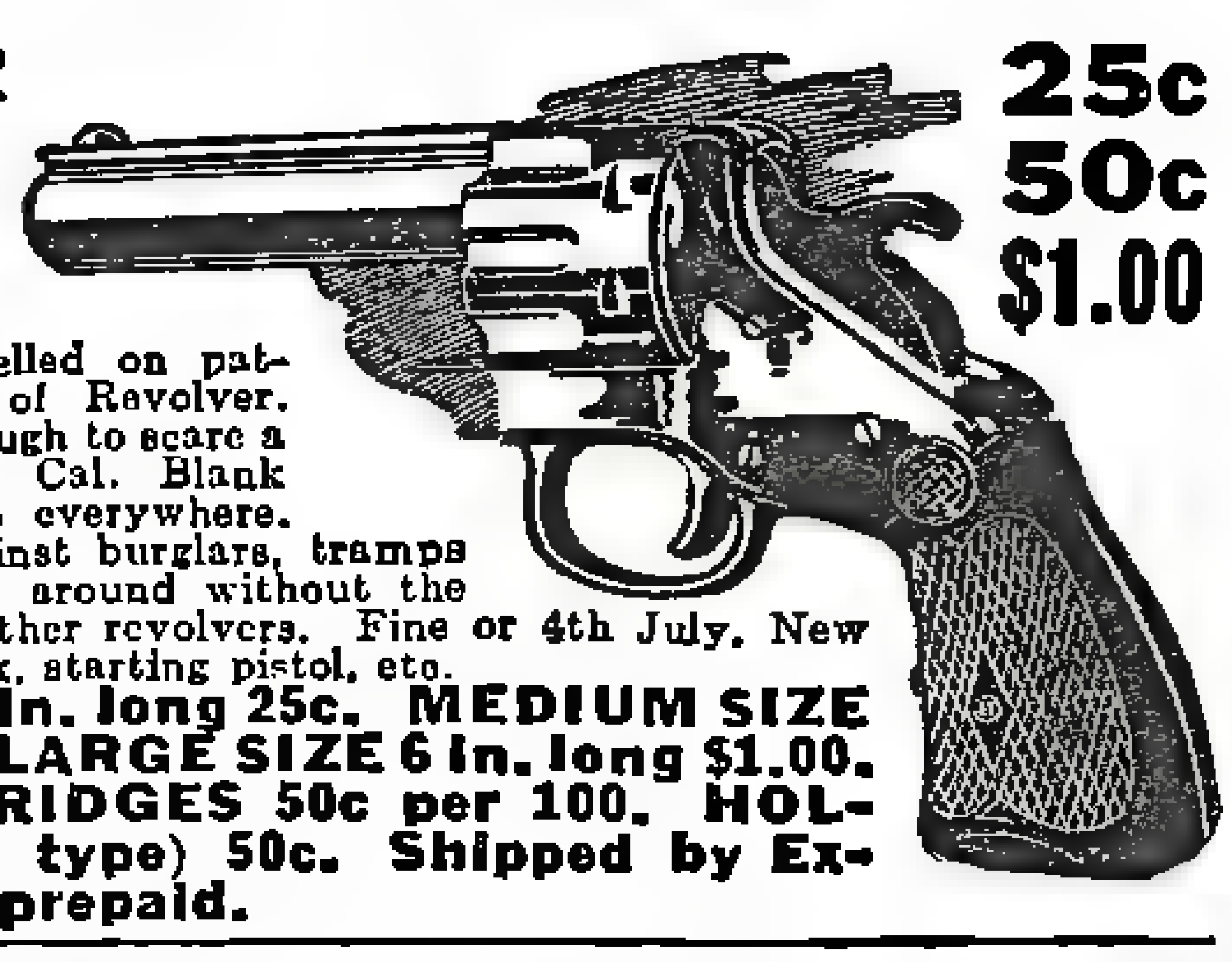
JOHNSON SMITH & CO.

Dept. 619 RACINE, WIS.

A copy of our NEW CATALOG mailed on receipt of 10c., or the De Luxe Edition with cloth binding 25c. Bigger and better than ever. Only book of its kind in existence. Contains all the latest tricks in magic, the newest novelties, puzzles, games, sporting goods, rubber stamps, unusual and interesting books, curiosities in seeds and plants, etc., unprocurable elsewhere. Remit by Coin, Money Order, Check or unused U. S. Postage Stamps, for all articles listed above. Canadian money, stamps and Postal Notes accepted.

BLANK CARTRIDGE PISTOL

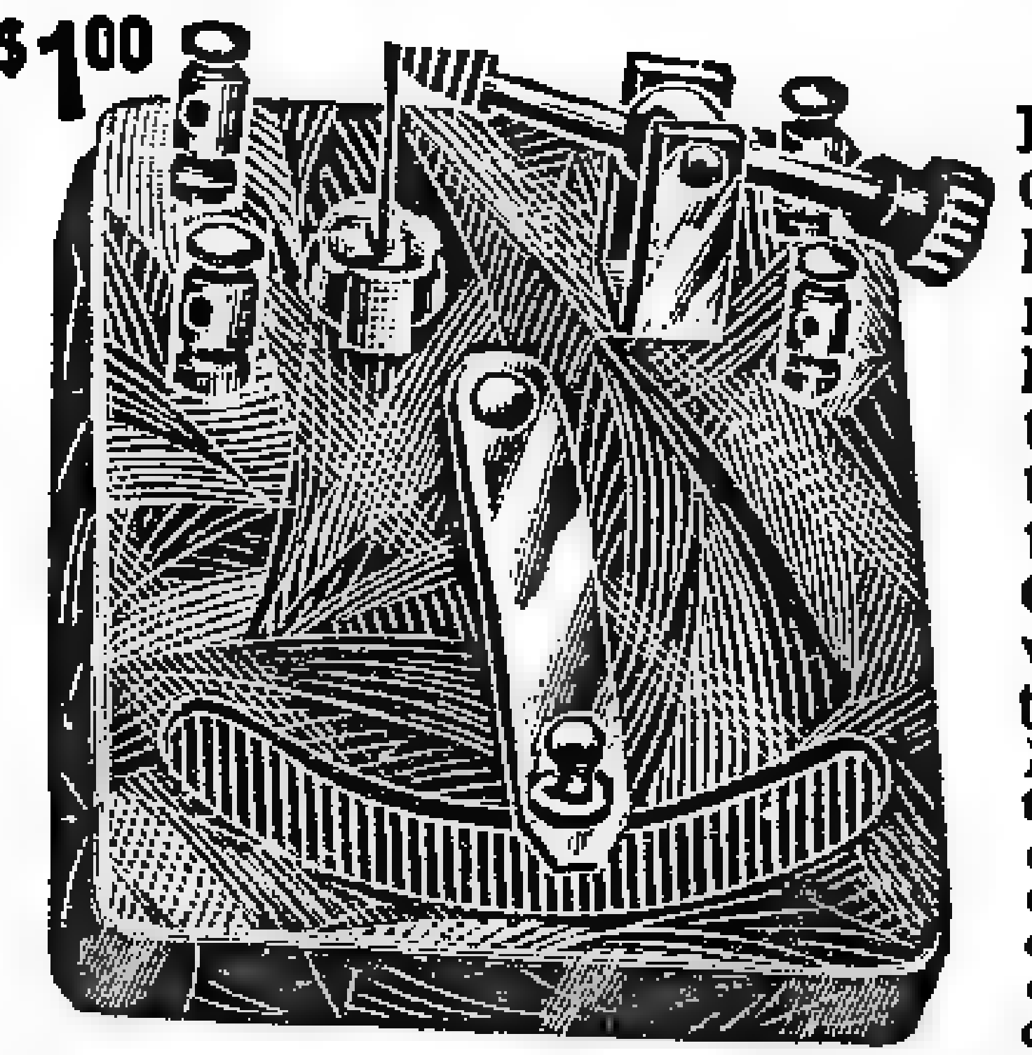
REVOLVER STYLE



25c 50c $1.00

Three new models now out, **25c, 50c and $1.00.** Well made and effective. Modelled on pattern of latest type of Revolver. Appearance alone enough to scare a burglar. Takes 22 Cal. Blank Cartridges obtainable everywhere. Great protection against burglars, tramps dogs. Have it lying around without the danger attached to other revolvers. Fine or 4th July, New Year's, for stage work, starting pistol, etc. **SMALL SIZE 4 in. long 25c. MEDIUM SIZE 5 in. long 50c. LARGE SIZE 6 in. long $1.00. BLANK CARTRIDGES 50c per 100. HOLSTER (Cowboy type) 50c. Shipped by Express only not prepaid.**

CRYSTAL RADIO SET $1.00



Say what you will about Electrical and Battery Sets, a CRYSTAL set has them all beat for simplicity and clearness of tone. There is absolutely no noise and no distortion—no batteries to buy—no tubes to wear out—no maintenance expense whatsoever. Cost nothing to operate and will last indefinitely. Reception is loud and clear. This Receiver is guaranteed to work equal to the most expensive Crystal Set you can buy. Has a receiving radius of over 25 miles, or under favorable conditions up to 100 miles. Constructed of the finest materials throughout, including supersensitive crystal, assuring quick results. PRICE of Receiver only **$1.00 postpaid.** Or complete with Ear Phone and Aerial Kit—everything all complete—nothing more to buy, **$2.95 postpaid. JOHNSON SMITH & CO., Dept. 619, RACINE, WIS.**

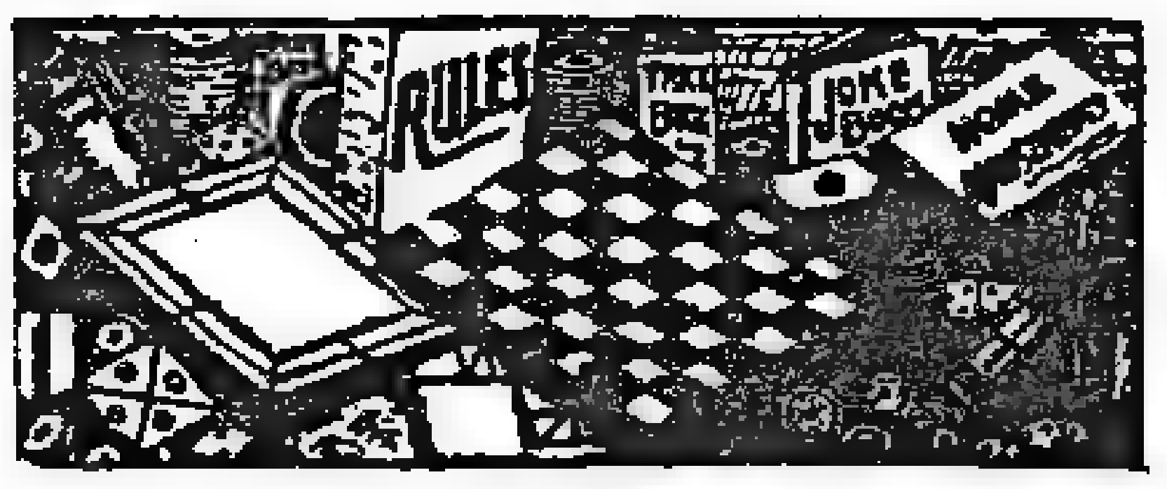
CHAMELEONS—25c

LIVE, SAFE DELIVERY GUARANTEED

Watch it change its color!

Get one of these most wonderful of all creatures. Watch it change its color. Study its habits. Wear one on the lapel of your coat as a curiosity. Watch it shoot out its tongue as it catches flies and insects for food. No trouble to keep. Can go for months without food. Measures about 4 inches in length. Shipped to any address in U. S. A. by mail. We guarantee safe arrival and live delivery. PRICE 25 CENTS POSTPAID.

BIG ENTERTAINER

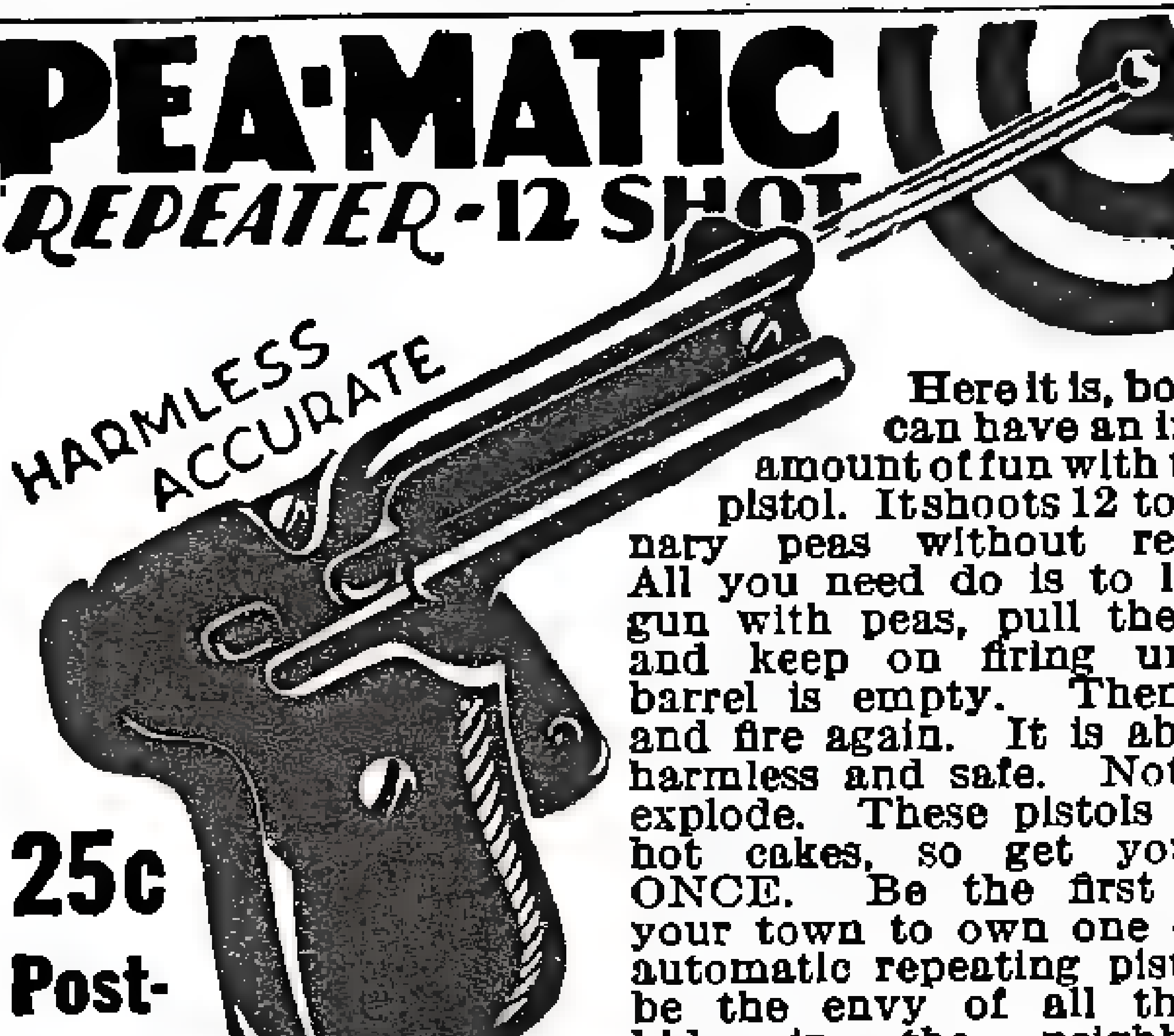


326 Jokes and Riddles, 25 Magic Tricks, 10 Parlor Games, 73 Toasts, 13 Fairy Tales, 105 Money-making Secrets, 22 Monologues, 21 Puzzles and Problems, 5 Comic Recitations, 10 Funny Readings, 11 Parlor Pastimes, 13 Flirtations, 1110 Girls' and Boys' Names and their Meanings, 10 Picture Puzzles, 69 Amusing Rhymes, 37 Amusing Experiments, Deaf and Dumb Alphabet, Shadowgraphy, Gypsy Fortune Teller, How to Tell Fortunes with Cards, Dice, Dominoes, Crystal, Coffee Cup, etc. Hypnotism, Ventriloquism, Cut-outs for Checkers and Chess, Dominoes, Fox and Geese, 9 Men Morris, Spanish Prison Puzzle, Game of Anagrams, 25 Card Tricks, Crystal Gazing, etc.

ALL-FOR 15 CENTS POSTPAID

PEA-MATIC

REPEATER-12 SHOT



25c Post-paid.

Here it is, boys. You can have an immense amount of fun with this new pistol. It shoots 12 to 15 ordinary peas without reloading. All you need do is to load the gun with peas, pull the trigger and keep on firing until the barrel is empty. Then reload and fire again. It is absolutely harmless and safe. Nothing to explode. These pistols sell like hot cakes, so get yours AT ONCE. Be the first boy in your town to own one of these automatic repeating pistols and be the envy of all the other kids in the neighborhood. **PRICE ONLY 25 CENTS POSTPAID.**

JOHNSON SMITH & CO., Dept. 619 Racine, Wis.

This Magic Box

Turns

Spare Time Into Money! Up to

$40 a Week!

without Leaving the House

We show you how to make big money decorating fast-selling Giftwares and start you off with the big, complete $10 Artist's Outfit shown above. Also Free Idea Book that has started hundreds of men making big, easy money. One Fireside Member says, "I made $100 on furniture in one week." Another writes, "My sales were $500 for 5 weeks. This is my first year." R. M. P., of Illinois, says, "I did $3500 worth of business last year and over $12,000 this year." D. W., New Mexico, reports, "I would not take $1000 for my Course." If you really want to make big money, a *guaranteed income* opportunity is now ready for you with Fireside. No tiresome study. You learn by doing. You make good money practically from the start. Our FREE Book tells you how. Send the coupon for it.

NO SOLICITING....
NO CANVASSING

It's easy to dispose of everything you make. Our new "Automatic Salesman" does all the selling for you. This vendor is designed to quickly find cash buyers for **all the Giftwares you can turn out! No soliciting or house to house canvassing required under this method.** Nor do you need any artistic ability in order to succeed. Simple "3-Step Method" makes the work easy to learn and easy to do. Under new Plan your membership need not—should not—cost you a penny. Get full details. Coupon brings everything.

FREE Book on Decoration

FREE! of extra cost. Send coupon for details of amazing new Plan that tells how to get a big assortment of beautiful giftwares that you can decorate.

Mail the coupon NOW for the beautiful new Book on decorating at home for big money. A new Plan that gives you a quick start included free. Mail coupon now while openings for new members are still being offered.

FIRESIDE INDUSTRIES
Dept. 142-A Adrian, Michigan

Fireside Industries,
Dept. 142-A, Adrian, Michigan

Send me FREE Book on Home Decorating for a big steady income. Also how to get the big Artist's Outfit.

Name ....

Address ....

City .... State.....

Secrets of Radio's Sound Experts

(Continued from page 69)

flakes or cooked macaroni produces a surprisingly realistic effect.

A few sound engineers can imitate a jungle full of monkeys—if they are provided with wet corks and bottles. They rub the wet corks on the bottles, and the moods of the monkeys vary according to the amount of pressure exerted.

One mystery thriller called for the splitting of the victim's head by an ax wielded by the villain. The studio and laboratory was a shambles when the sound engineers finished their experimenting. Armed with axes, they went about splitting everything available in a frantic effort to find a sound like a head being split. Finally someone requisitioned a head of lettuce and split it with an ax. Almost right. Try a head of cabbage. Perfect!

Fisticuffs on the Air Waves

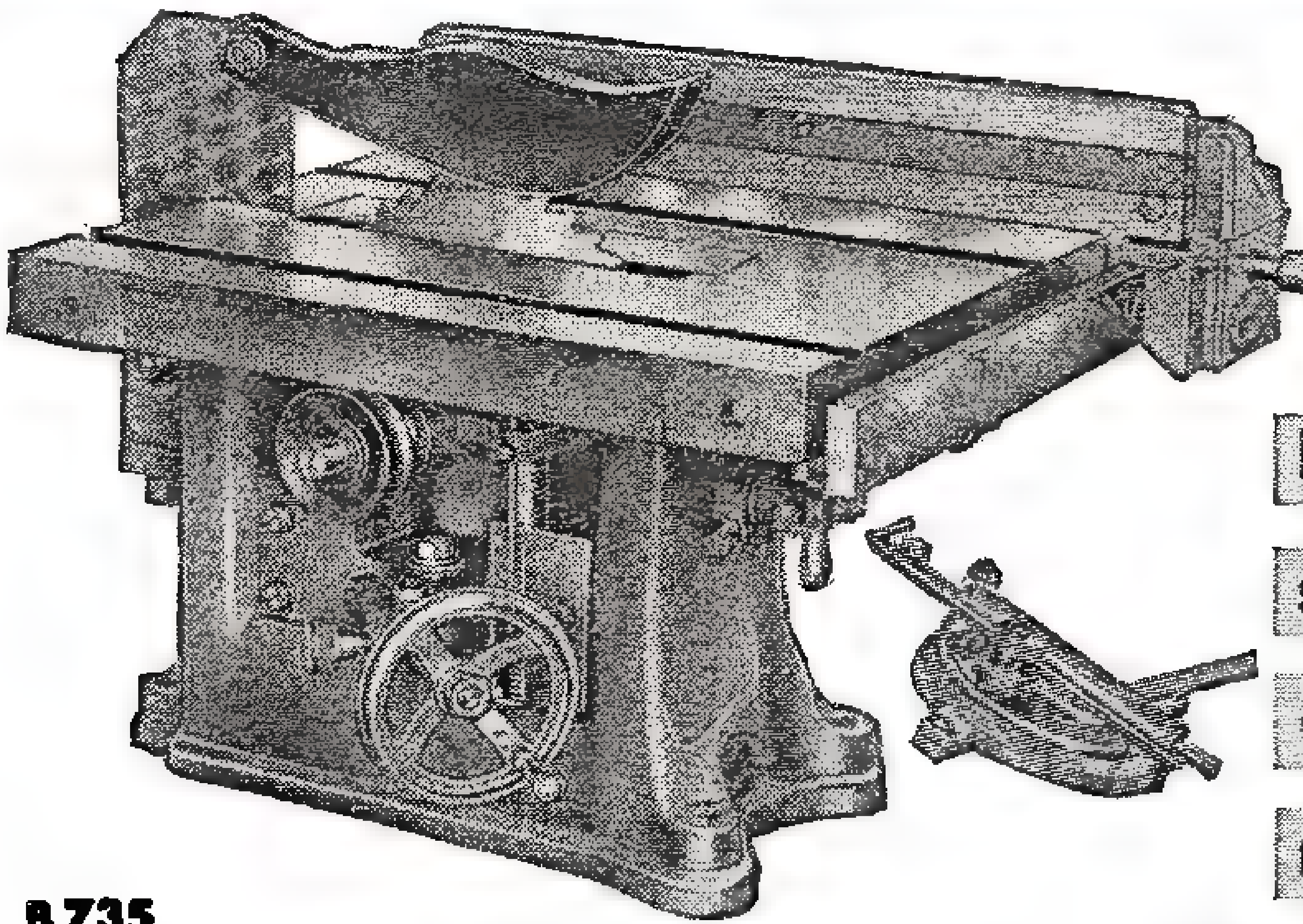
When the hero belts the villain, and you hear the thud of heroic fist against sneering jaw, the hero has struck his fist against the palm of his hand. To crack an egg, a piece of cellophane is flicked with the finger.

A metal strip is attached to a tambourine—with the bangles removed—and the metal snapped against the drum head to produce a pistol shot. For a larger calibre pistol or a rifle, a larger tambourine and metal strip is used. To reproduce the sound of a cannon shot a tympani, or bass drum, is struck. Thunder crashes are reproduced by striking a tympani with a softly padded mallet, or by shaking a large metal sheet, called the "thunder sheet."

One of the most difficult sounds to reproduce is falling rain, as it sounds like static. Mr. Kelly used to crush excelsior close to the microphone, or gently rub a scrub brush over a piece of window screening. Now the usual means is to drop sand from a perforated box onto a sheet of cellophane. If the rain is supposed to be "swishing," the cellophane is held at an angle and the sand allowed to slide on it. If the rain is supposed to be falling on a tin roof, a sheet of tin is substituted for the cellophane. A metal cylinder containing lead shot is revolved to produce the roar of the surf.

Staging a Jungle Battle

In a recent broadcast the sound engineers were called upon to produce a battle between a cobra and a mongoose. They knew the cobra was dumb, but didn't have any idea of the kind of sound a mongoose, fighting for its life, would emit. After much research, they found an explorer who had actually seen a death struggle between the two creatures. The sound engineers were appalled when the explorer told them that the mongoose was also dumb. They put their heads together, studied pictures of the mongoose, and decided what kind of a noise they would make if they were mongooses (or mongeese) fighting for their lives. Finally they decided it would be something like the squeak of a rat. They had to have a sound, for a silent fight would not mean much to the radio audience. A rubber doll that squeaked when pressed, was



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utilized to produce the cry of the mongoose.

If the script calls for a jungle native to shoot an arrow through the heart of his enemy, the fans produce the swish of the arrow through the air. The piercing of the heart of the victim, horribly realistic over the air, is merely a reed being thrust through a head of cabbage.

The native rushes to scalp his dying enemy, crashing through the tangled underbrush. Snapping twigs, however, sounded like pistol shots through the mike. So a whisk broom was taken from the coat closet, the straws squeezed and released and brushed against the hand. Crackling underbrush? Close your eyes and try it. Mr. Kelly has found the whisk broom invaluable. It does the work of an entire forest and in his deft hands is the rustling of leaves, the swaying of boughs, the crackling of underbrush or a prairie fire.

Sound technicians develop a "mike ear," just as the artist develops an eye for color or line, as the sculptor singles out a beautiful head or shoulder from a crowd.

Walking down the street, the sound technician hears an unusual noise. Immediately he associates that sound with another that he has heard, tried to reproduce. He immediately investigates, finds, perhaps, that it was a squeaking shoe, the sound of a coin dropping on concrete, the scratch of a match against a window pane—and another sound effect to "fool" the mike is born.

Wealth in Virginia's New Gold Rush

(Continued from page 49)

The entire piece of property takes in about 9,000 feet. Of this only about 4,000 feet is being mined today. The Vaucluse mine is at one end and the Melville at the other.

Here's what the visitor to the mines is privileged to view, feel and hear:

A slimy ore bucket drops quickly down the entire length of the 220 foot shaft. Workers can see what's going on only by the dim glow of carbide lamps. Always is heard the monotonous beating of pneumatic drills which open up gaping holes in the face of the drifts below.

Blasts Reveal Golden Wealth

As if the noise from the pneumatic drills and water pump were not enough, every half hour or so you hear another deafening roar. This is a powder blast, carefully placed at some strategic point to reveal another gold-filled face. Thus far, about 1600 tunnels have been built along the vein containing the precious gold, blocking off about 60,000 tons of ore.

Granted that all the ore lives up to its present estimated production value of $5 a ton, then about $300,000 worth of gold already has been blocked off.

Hoyt Barnett, noted Washington, D. C. mining expert, describes the set-up:

(Continued on page 124)

Build Coach for Table-Top Railway

(Continued from page 111)

body, acting as a retainer, 1 15/32" by ⅛". By the aid of center lines, glue these together in order and put in a visc or in clamps to set. When dry, round off the long edges of the upper two layers as shown in the end view of the car, and then the ends as in the side elevation. Careful fitting will be necessary to make the roof set snugly in place.

Make Steps From Postcard Stock

Steps of stiff paper or very thin postcard stock are quickly made if a template is carbon-traced from an exact size drawing. By drawing around the template, all steps needed can be laid out in a few minutes. Bent and glued solidly, these steps are durable; a coat of lacquer in black or the so-called "Pullman green" will further strengthen them. Diaphragms, those bellows-like vestibule connectors, will each require a cut-out "plate" of the same stiff card as the step material, and a folded strip of thin black or blackened cloth. Glue is the holder for these, too. Leave the steps out of their square cutouts until the trucks are applied, to prevent wrecking them if the body is set down. Celluloid or cellophane glued inside the windows makes a good "glass."

No under-side beam is specified as the car is supposed to represent the latest self-supporting type. If you have a different kind in mind fit out the under side of the floor accordingly.

Modern Four-Wheel Trucks Are Used

In line with modernism, the trucks are four-wheeled. For a while the roads have been using six-wheeled Pullman-style trucks. With lighter cars back again, though just as big and much better, the four-wheel truck has come back. The truck shown in the drawing is not the most elaborate to be had, but looks well and is easy to make. It consists of two side frames and a bolster joining them, cut from about 18 gauge sheet brass, and two pairs of wheels. Wheels can be bought for a few cents each, but if you have a lathe, make them to the dimensions given.

The two bolsters allow the frames to swivel up and down with uneven track. Trucks with actual spring and equalization between wheels work better than this type, but the work is more than proportionately greater. Bolting with 6-32 screws is all right, but file down the heads where they stick out on the sides. A longer 6-32 bolt will act as king-pin. If couplers are added, they will work best when fastened to a long strip of metal with a hole in the far end to go over the king-pin. The center-of-truck pull developed permits closer coupling of cars and makes for better action on curves, with less swing between them.

Paint should be flat, not a lacquer, on the body and trucks. Too new an appearance will result from the use of a shiny surface; since the cars won't have a chance to weather it off, the rolling stock will not resemble actual equipment. A good color combination is deep green with gold lettering.

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28x5.25-18	2.90	1.15
29x5.25-19	2.95	1.15
30x5.25-20	2.95	1.15
31x5.25-21	3.25	1.15
28x5.50-18	3.35	1.15
29x5.50-19	3.35	1.15
30x6.00-18	3.40	1.15
31x6.00-19	3.40	1.15
32x6.00-20	3.45	1.25
33x6.00-21	3.65	1.25
32x6.50-20	3.75	1.35

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33x4½	3.45	1.15
34x4½	3.45	1.15
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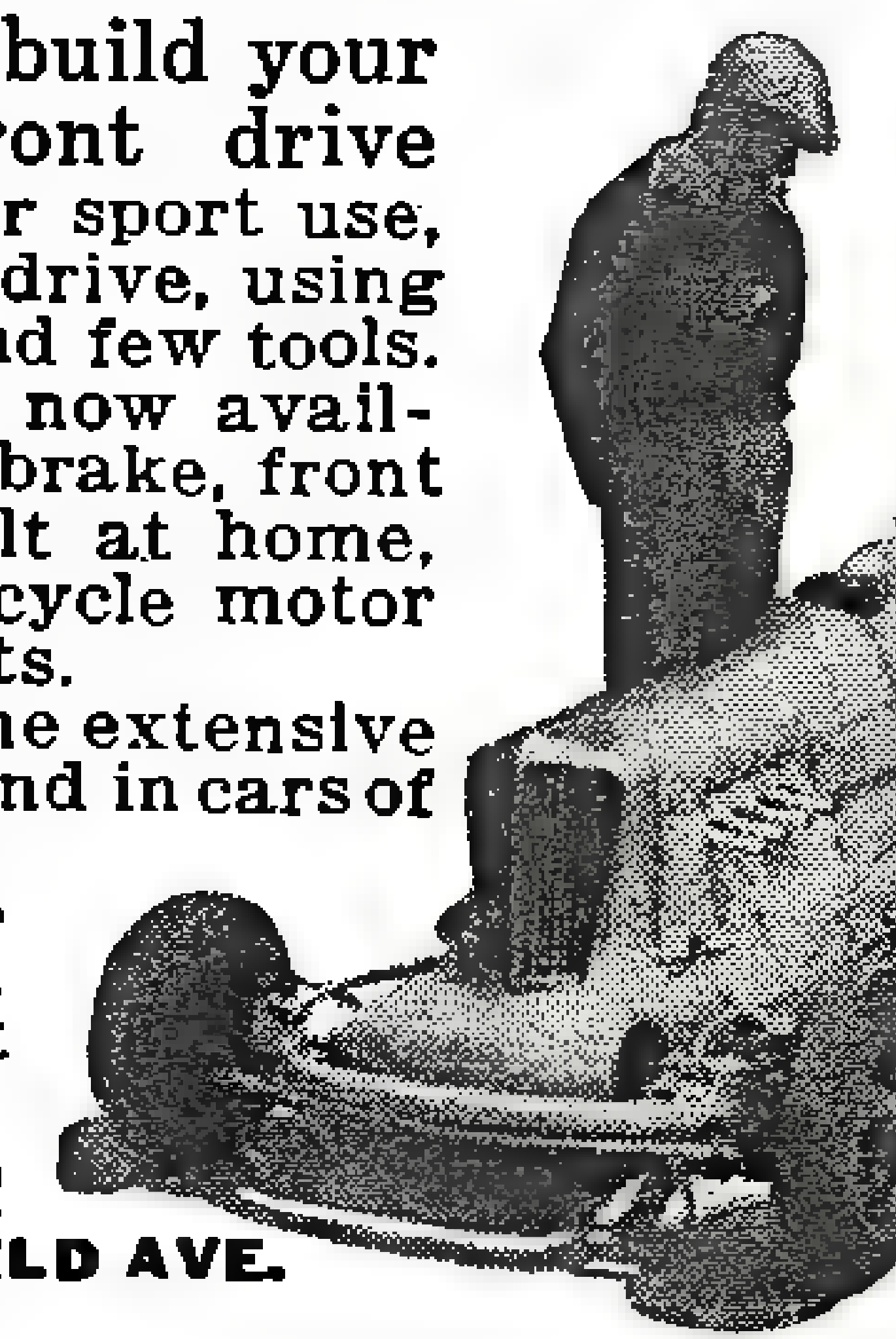

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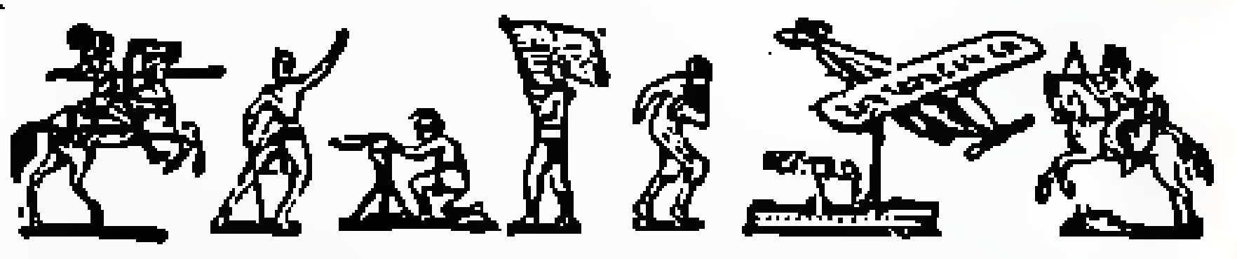

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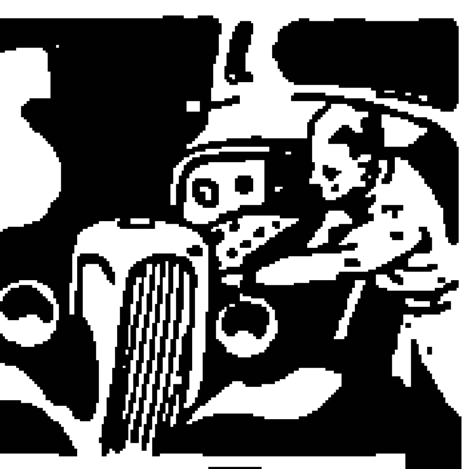

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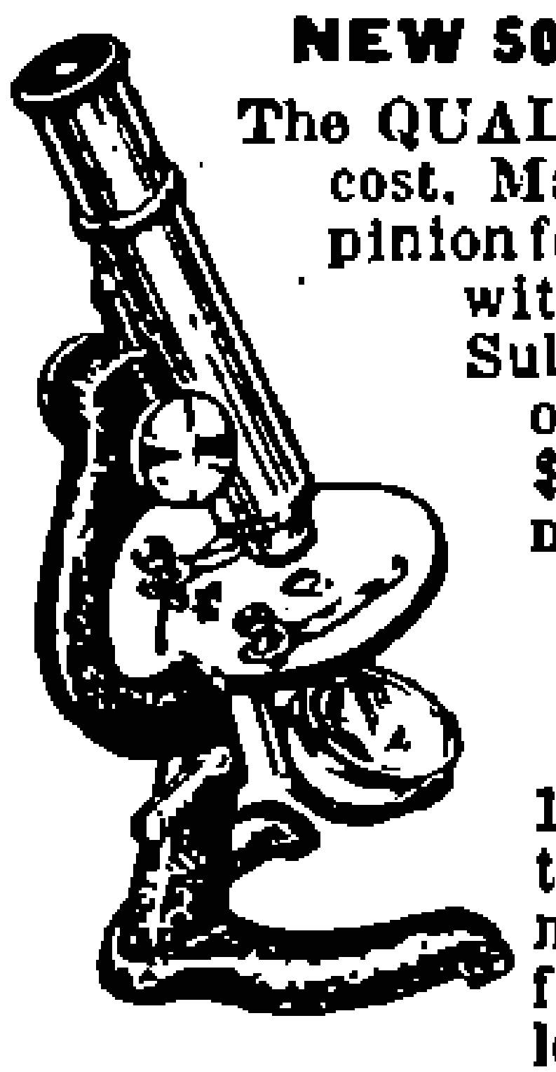

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Print Photos in Color on Metal Gifts

(Continued from page 103)

warm, but not hotter than the hand will bear. Within two or three minutes the gelatine will have dried down into a shiny film, and it can be placed in a print frame under the negative.

The exposure is made about 20 inches from an open arc lamp, and will require from one to three minutes. You can also use direct sunlight. In either case, make a note of the time for future guidance. The exposure is correct when you can see a faint brown image of the picture on the coated copper. If you do not give the correct exposure the first time, wash off the copper (again polishing with pumice) until it is clean, and coat it with the gelatine.

The exposed copper is removed from the printing frame, in the yellow light, of course, and placed in a pan of cold water. This will wash out the orange chemical in the gelatine. Now place the letter holder in a pan of tepid (not warm) water for several minutes. You can then drain off the water and remove the surface moisture by a very careful brushing with a wad of clean, slightly damp cotton.

Have ready, beforehand, a glass plate on which you have worked up a bit of printing ink with an ordinary hand printing or proofing roller. You can borrow one from your job printer. Ordinary printing ink can be used, but if lithograph ink is available, use it.

Inking is done in white light. Pass the inked roller over the moist gelatine surface again and again, until the picture appears in the density you wish. It will be clear, with every detail showing. Allow the picture to dry and then spray it with clear lacquer.

Riding Skyways With Barnstormers

(Continued from page 75)

ered outfits that have turned barnstorming into a modern industry. Mel's Ford tri-motor and Waco J-6 are known from coast to coast, and when Mel sets his flying factory down into an airport, the local pilots declare a holiday just to watch real flying artists at work.

"Besides the two ships, we use a sound car for the ballyhoo," explained Mel. "The two ships and the car are our tools. We've got the best talent I can assemble and our flying work bears the stamp of authority, a very necessary thing in creating confidence in the flying public.

Swanson's Barnstorming Personnel

"The man in the sound car, who has modernized the old sideshow barker's methods, is Paul De Weiss. How that man can sell rides after we've shown our aerial stunts!

"Then there is Sergt. Richter, my co-pilot who pinch hits in great shape on the longer excursions we organize, and Billy Morgan, another top hand, who knows the passenger hopping business and his airplanes too. With talent like that you've got a real air show—and the public likes it, plenty."

Before going to work in a community, Swanson makes a complete survey of the territory. He knows all about the population, percentage of unemployed, has tabulated the pay days of the important industries. He

(Continued on page 125)

Lighted Decorations for Christmas

(Continued from page 95)

against the blue sky. Tack a scrim or net screen of theatrical gauze over the front of the shadow box. On this paint with bold letters a greeting such as "Merry Christmas" in such a way that the thread only is colored and the fine mesh is not closed with the paint. Use five 50-watt lamps in the footlight. Plug this cable into a socket in which a flasher button has been placed. Paint the outside of the box and trough gray and drape the bottom edge with gray cloth. When the foot lights are on the greeting is flashed to your neighbors; when they flash off the scene behind will mysteriously appear.

Shadow Box Fits in Window

The shadow box, Figs. 3 and 4, is intended to fit against the glass of a window from the inside. Figures are drawn and cut out as described before. Mount the Wise Men 2" from the front edge and the City of Bethlehem 3" behind that. Cut out the star and rays for the background, cover with yellow tissue on the back, and mount a tiny light to shine through. Three 25-watt blue lights on the floor between the background and the cutout of the city, and one amber light behind the Wise Men are used. Paint the background navy blue, the city white on a mountain of dark brown, and the Wise Men black.

A 10' pole painted black, with a large screw eye in the top, is the basis for a "Treeless Christmas Tree." Stretch wires from the screw eye to the ground in a circle 6' in diameter. String outdoor Christmas tree lights along these wires to within 3' of the ground. Mount a star and light at the top as shown in Fig. 7. The secret lies in using a great number of lights staggered along the wires, and in placing this away from the street against a dark background.

Giant Candles Are Effective on Lawn

Giant candles, Fig. 8, are used in pairs beside entrances, on porches, or on lawns. The frame work of the candle is covered with single-faced corrugated board.

While time itself dates from the first Christmas, we moderns must have our trees in the modern motif. The base and standard, Fig. 1, is constructed according to dimensions and directions shown. The frame for the base and the trunk is covered with single faced corrugated board to which black oil cloth is glued.

The star (see Fig. 2) is made from a coat hanger; it also serves as a holder for a light socket. Truncated pyramids of double faced corrugated board are constructed according to dimensions given in the detail of Fig. Ia.

If you live in an apartment and have no fireplace on which to hang your stockings you can build your own very easily. The frame is 2" x 2" material constructed as in Fig. 11. Cover with corrugated board to which crepe paper in brick pattern is pasted.

Cut andirons from wallboard, strengthen with light wood strips, and nail to the log

(Continued on page 125)

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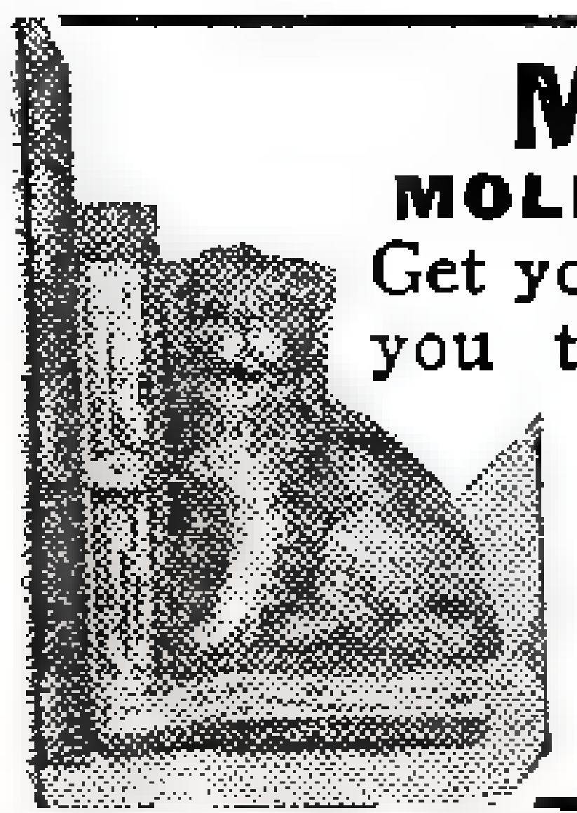
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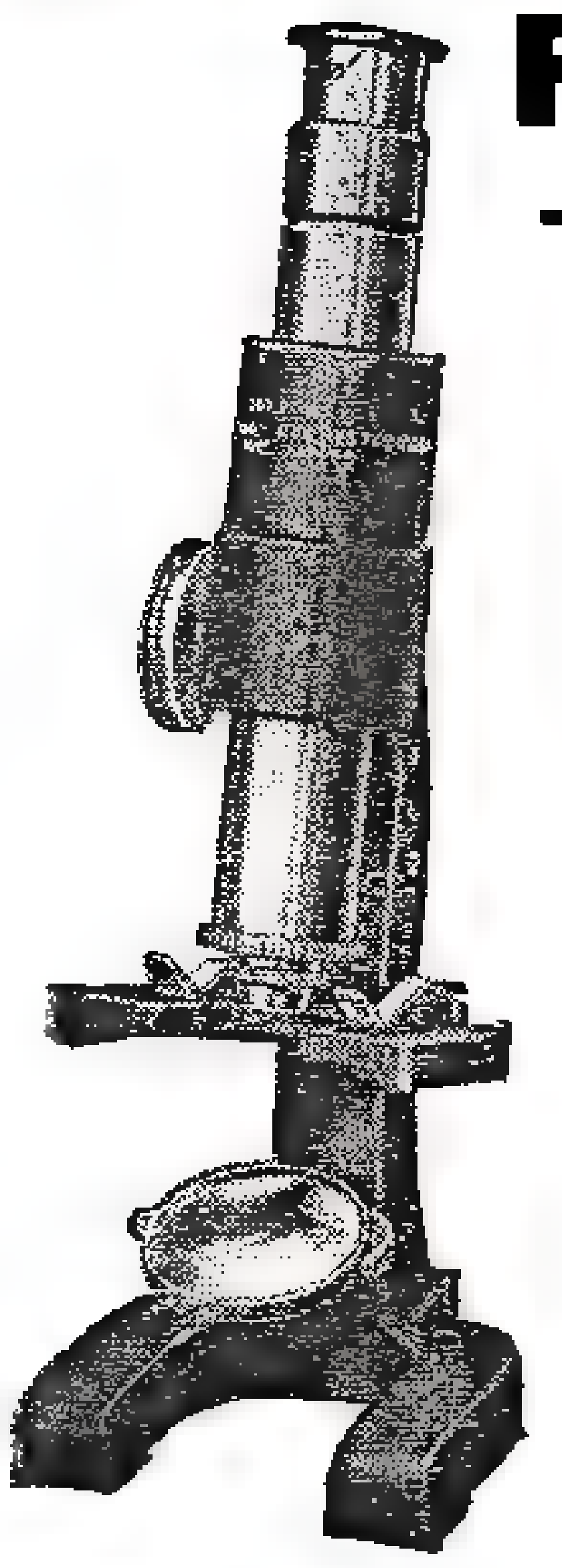
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Microscope Detects Crime Clues

(Continued from page 63)

identical with that on a projectile shot from the gun of an arrested suspect, guilt is established.

Blood films may be prepared upon microscope slides where a fresh drop of blood is available. Upon the instant of its appearance this drop is pressed onto a thoroughly cleaned cover glass. A second cover glass is immediately dropped lightly upon this, then drawn off sideways without pressure.

After the film left on the glass has dried thoroughly in air, two drops of Wright's staining solution for blood are allowed to stand upon the glass for one minute. Without draining off the stain, two drops of distilled water are added and allowed to stand for three minutes. The cover is tilted to drain off the stain, several drops of distilled water added, and color changes in film noted.

The cover glass is placed, film side up, on a blank slide as a temporary support. When the red corpuscles have a salmon-red color, the bleaching action of the water is stopped. The water is drained off, and the film gently blotted with a piece of filter paper. After allowing five minutes for drying, the cover glass is mounted, film side down, in balsam.

Wealth in Virginia's New Gold Rush

(Continued from page 119)

"Rock from the exploration tunnels is waste matter, but when workers are in the 500 foot thick vein, the ore removed is hoisted to an elevated tower over the shaft and run through the mill. This mill crushes the ore to the fineness of sand and runs it through what is called the 'flotation process' for the concentration of mineral values.

"The pilot mill is a revelation to the layman. The ore slides into it with a thumping roar. It first goes to a 'buster' which makes medium-sized chunks out of the big pieces. Then the ore is delivered by belt to a revolving drum which looks like a concrete mixer.

"Inside the revolving steel drum are gigantic steel balls, weighing more than 10,000 pounds. As they bump together and bounce away, the ore is broken into smaller pieces.

"Emerging from this revolving masticator, the ore is mixed with water and run across a screen. Large pieces are scraped back for another trip through the crusher. Fine pieces, now like sand, wash on to be mixed with two oils, one of which causes a froth and the other an oil-coating around the mineralized particles.

"The froth clings to the oil coating and, by simple physics, lessens the specific gravity of the mineral particles to the extent that they float to the surface.

"The mixture of oil, ore and water is sent through a series of cylinders, and at last the concentrate floats off to lie in vats.

"After drying partially, the concentrate is baked in an oven until it contains only 1½ per cent water. Then it is sacked and is ready for a trip to the smelter."

Riding Skyways With Barnstormers

(Continued from page 122)

knows from experience what percentage of trade he can draw from surrounding towns. He has learned the air history of the region, whether there have been any bad accidents of late, how the public feels about flying, and whether they really do have money to spend.

"Mining and industrial towns are the best bets, especially on payday," says Swanson. "Then we clean up.

"We hold the stunting talent in leash until late in the day, to hold the crowd when interest begins to lag. The tri-motor is generally running from 10 a. m. until dark, because our advance car with its handbills and our local newspaper advertising have given us enough advance ballyhoo to have a crowd on hand.

"As against the old method of waiting for lone $5 hops while the cows ate the wings off the ship, we have cut rates to a minimum and are on the go every minute. My peak day was one day last summer when I made 76 separate flights and carried 908 passengers. At 60 cents a head, figure it out.

Idling Motors Create Business

"We draw our trade from the crowds we can pull to an airport. And we want to keep the crowd on its toes all the time, so the motors are left running. We have to charge off considerable gasoline to advertising in this way, but I find it pays."

It is small wonder that the whole barnstorming profession is taking lessons from this young man who has modernized the old game with such a bang. He uses a dash of Pied Piper psychology in his formula plus a round measure of confidence-inspiring all-star talent. He works on the chain store principle of quick turnover, and he has never had a major accident! He has made more take offs and landings than any living man. Small wonder he knows his business!

Lighted Decorations for Christmas

(Continued from page 123)

rests which are of 2" x 2" material, Fig. 12. Toe nail the logs in place as shown. Tack a strip of red muslin to the back of the front log, then stretch forward and tack to hearth. Sprinkle lump alum over this and place a light under it to give the effect of glowing coals. Strips of red and yellow cheese cloth tacked to the logs and allowed to flutter in the breeze of a 6" fan will give the effect of flames when lighted with red and amber lights from below, Fig. 13.

The star, Fig. 9, makes an attractive decoration when hung from the eaves of the house or from limbs of trees on the lawn. Mark a barrel hoop into equal sections and bore small holes at each point. Lace light wire or cord through the holes as shown, Fig. 10, forming a loop in which the light socket is held. When the wire is drawn tight a star is formed with a light at each point. Cover the portions of the wire shown, Fig. 16, with silver or gold tinsel and wrap around the hoop also, to complete the design.

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SEE PAGE 12

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How to Start Car in Cold Weather

(Continued from page 99)

Often a battery is discharged so far in attempts to start the engine that its voltage has dropped below that required for ignition purposes. No amount of cranking can then start the engine.

Disconnect at the coil the lead running to the ignition switch and battery, and connect in its place one wire from a 6 or 8 volt bell transformer. Ground the other transformer lead to the engine or frame of the car; polarity is immaterial. Alternating current will work just as well as direct current with the ignition coil, so the car can now be started, either by cranking or with the starter. Let the motor run for a few minutes until it is warmed up, then shut it off and replace the regular connections. By this time the battery will have been charged enough to supply ignition current for the warmed-up engine.

An extra dry cell will often start a car having a weak battery. Connect it in series with the ignition coil lead going from coil to switch, maintaining the same polarity at the coil. Thus, if the positive of your car battery is "hot", and ordinarily runs to the coil, the positive of the booster battery should face the coil.

Gasoline vaporizes with difficulty in a cold engine. Oftentimes the car can be started merely by applying heat in some form or other to the carburetor and intake manifold. A hot electric iron or a bag of hot sand held against the manifold for five or ten minutes will take away the chill from metal parts.

A better method, perhaps, is to wrap cloths around the carburetor, then pour boiling water over them slowly.

Build This Two-tube All Wave Radio

(Continued from page 91)

A .1 mfd. condenser isolates the ground connection and chassis from the power line, preventing short circuits which might burn out the house fuses.

While a small 10,000 ohm metallized resistor, by-passed at each end by an 8 mfd. electrolytic condenser, is used here as a filter pack, some may prefer to use an old audio transformer or standard 30 millihenry choke in place of the resistor.

After fastening the chassis to the front panel with angle brackets, mark the location of each part and drill the necessary holes. Mount the three tube bases, antenna and tuning condensers, potentiometer and phone jack, then begin with the wiring.

A shield should be used over the 6C6 tube for noise-free reception. This can be bought at a radio supply house for about ten cents.

Complete coil winding data has been given for those who prefer to wind their own plug-in coils. Tube base forms can be used for the short wave coils, but these will be far too small for the number of turns needed on broadcast band coils. Shellac all coils after winding to keep the turns in position.

Try Small Boat for Big Game Fishing

(Continued from page 83)

enjoyed by only the select few who claim possession of elaborate cruisers and yachts and who have time and capital to voyage to faraway seas. Sportsmen have come to appreciate recently that swordfish, giant bass, and other huge sea creatures are often taken a few short miles off shore.

On favorable seas there is no more than a spice of danger in wrestling a swordfish from a craft 16 to 20 feet in length. The tackle used in contesting swordfish, which may exceed 400 pounds in weight, must be strong and reliable. Most marlin hunters use what is commonly termed heavy tackle: a rod of split bamboo, hickory, or other stout wood between five feet and five feet nine inches in length and weighing not more than 16 ounces, and a reel which spools from 400 to 1000 yards of 24-strand line that breaks at not more than 66 pounds dry. Most big game anglers wear a shoulder harness, which serves to support rods during long struggles.

Swordfish are ordinarily taken by trolling dead bait—flying fish, bonito, or barracuda from 12 to 14 inches in length. A special swordfish hook, size 12/0 to 14/0, is used on a 15-foot steel wire leader. The bait is trolled about 50 feet behind the boat which is idled down to not more than four knots per hour.

Advantage of .22 Rifles for Hunting

(Continued from page 82)

been soaked in water through the gun. Then in succession use three other water soaked patches and dry with two or three patches. This, of course, is for use in a gun that is quite dirty. After the barrel has been thoroughly dried, run several greased or oiled flannels through it, and finally a greased rag, especially if you are going to put the gun away for a week or more. A dry patch should be put through, however, before you use the gun again to remove the grease. Patches used should never be too large. The patches best to use are three-fourths of an inch square.

A word of caution with regard to the cleaning of the rifle might be offered to advantage. In using the steel rod do not run it in from the muzzle, permitting the rod to wear against the edges of the muzzle. Thousands of rifles owners do this, the result being that in time there is a slight wearing away of the steel at the muzzle, not much it is true, but sufficient at times to make the firearm inaccurate. Try to clean the arm if possible from the breech, and not from the muzzle. If your gun cannot be cleaned from the breech, guide the rod with your forefinger and thumb so that the steel at the muzzle is not worn against.

As to whether the .22 selected should be a one-shot rifle, a hammer or bolt type rifle, a repeater or a recoil-operated auto-loader is entirely a matter of preference, and is up to the individual to select as he sees fit. So far as the boy is concerned the single shot rifle is probably the best, in that with one shot at a time at his command, accuracy is promoted.

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29x5.50-19	3.35	1.15
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32x6(10)	8.95	2.75	40x8	15.95	4.95

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Previewing 1935 Automobiles

(Continued from page 53)

12 cylinder horizontally opposed power plant. It is mounted in such a manner that it may be pulled out of the frame on a dolly, just like yanking out a sore tooth. This makes it easily accessible to the mechanic.

The pancake engine is an exclusive White creation. This unique design was achieved by opening the angle of a "V" type engine so that the two banks of cylinders, containing six each, are horizontally opposed.

The engine is placed underneath the floor, with the cab moved forward to the extreme front end of the truck. It is claimed that with this arrangement perfect weight distribution is achieved.

Gain Power With Less Displacement

For the first time since Chevrolet added the Standard six in 1933, a four-door five-passenger sedan is now included in its lower priced line. Chevrolet declares it to be the lowest priced four-door sedan in the field of sixes and eights. Its list price is $540.

The major new feature in styling is the treatment of the rear end, where the body panels extend low in an unbroken contour to cover the back of the chassis. This construction does away with the rear cross-member cover, and provides a sweeping effect.

In line with the trend toward lighter cars, Chevrolet has made a valuable contribution. This company has developed an engine that gives 54 per cent more horsepower with 22 per cent less displacement.

Radial Engine Offers Air Cooling

The recent order placed by the government for a large number of Continental Aircraft engines for installation in war tanks has stimulated interest in the radial engine for motor cars. This type of engine is advocated as a logical power plant for rear mounting.

L. B. Kalb, of Continental, pointed out that the greatest advantage of the radial engine lies in its compactness, structural arrangement and low weight, which adapt it particularly well to installation in direct connection with the rear axle.

Manufacturers reserve their traditional right to disagree with competitors. While one school insists that the rear engine is right around the corner and is shaping cars to receive it, another argues against shifting the power plant. No less an engineer than Carl Breer, of the Chrysler Corporation, points out hazards in the mounting of the power plant over the rear axle such as increased danger of injury to occupants in the case of a crack-up. Chrysler engineers declare that the forward shifting of the engine over the front axle is the logical solution to the problem of correct weight distribution. There may be more logic in this than appears on the surface, for the general trend in 1935 models is to push the engine about eight inches forward.

For 1935, Chrysler announces the new automatic overdrive as standard on all DeSoto and Chrysler models.

Win Cash Prizes for Furniture Ideas

(Continued from page 45)

the back and bottom as illustrated, if the chair is both spring-back and spring-seat. Each strip must be drawn as tautly as possible to have lasting results. The best way to do this is to use an eight-inch board, padded at one end to avoid scratching the finish, and with three or four nails protruding at the other end to clinch the webbing. File the heads of the nails off to form points.

Make each end fast, weave the strip and use the board as a lever to pull it tight. All ends of the webbing should be turned back before tacking to prevent unravelling.

Space the springs as you found them in the old upholstery. Stitch the base of the springs to the webbing securely with No. 252 upholstering twine. Then tie the tops of the springs in a network with heavy cord so that pressure exerted on a few springs will be shared by the others. The ends of the cord should be nailed to the frame.

Cover Springs With Burlap

Cover the springs with burlap, stitching it to the spring-tops and tacking down the edges. Now the first horse-hair covering goes on in the form of a mattress, which should have overhanging sides to be tacked to the frame. Tack the sides, and sew the mattress to the springs with an upholstering needle.

Now another layer of horse-hair, salvaged from the old padding, is put on top of the mattress to smooth the ridges of the mattress. This layer is covered with canvas, which should be tacked down and sewed to hold the previous paddings in place and maintain the shape you have already effected by drawing the canvas firmly. Without fastenings, a layer of cotton batting is laid over the canvas to pad the horse-hair. The cotton will prevent wiry strands of horse-hair from working through. At this point it is well to make sure there are no hollow spots and that all corners are well filled out. Fill in by stuffing with horsehair or cotton.

Upholstering Chair Arms

The fabric you have chosen as the covering material should be cut so that the figure or weave of the cloth will run across both the back and seat in the same direction. This will match the pattern. The final covering is stretched smoothly over the cotton.

All box-like corners should be folded uniformly into the same shape. Tack the edges to the frame after the tapestry has been trimmed to an exact fit. A gimp, or strip of fabric, to match is tacked along the edges. For this small, round button-head tacks are the best.

Whether the chair-arms should be tackled first or last is a matter of preference. They should be built-up with the foregoing processes beginning with the horse-hair mattress which must be secured rigidly to the arm with nails. The inside frame of the arm, of course, receives the heaviest padding. The outside is merely covered with tapestry.

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For Thrilling Sport Start Skeet Club

(Continued from page 81)

driven in midway between AC. Using B as your center, measure a cord 20 yards long and describe a semi-circle shown on diagram as AEC. Drive stake E an equal distance from stakes AC. Then divide AE and EB each into three equal parts. These six parts should measure approximately 31 feet.

You have now located the eight stations where the shooting will be done. Permanent posts should be erected at each station with a small box nailed on top to hold shell boxes.

Skeet requires the services of two traps located in small houses at stations 1 and 7, each house to face one another. These houses are identical in construction with one exception—the opening from which the target is thrown. In the No. 1 trap, the trap door is higher. The bottom of the opening must be at least 10 feet from the ground while the No. 7 trap opening should be less than 3 feet. The No. 1 trap can be elevated on legs to accomplish this purpose.

The Skeet Program

The modern skeet layout utilizes an electric trap-pulling device, located behind station four, which regulates the timing of the targets.

A regulation target is one which passes over the middle station (No. 8) at a height of fifteen feet. The correct speed will throw them 15 to 20 feet past the opposite trap house. When passing over station 8, a regulation target will be traveling approximately 50 miles an hour.

Each skeet event consists of 25 targets. Two single shots, one from each trap, are taken from each of the 8 stations. Next come 4 sets of doubles, the targets being released at the same time, one from each trap. These 8 shots are taken from stations 1, 2, 6 and 7. You have now accounted for 24 shots, leaving one extra. To finish a box of shells, the last shot (known as the optional) may be fired from any station the shooter so desires.

12 Gauge Good All-Around Gun

Many types and makes of guns are used in skeet shooting including the over-and-under, pump, automatic and double. In the main, it's not the gun but the man who handles it. But one important point to remember, the gun *has to fit you.*

The standard shot loads of the different gauges are: twelve-gauge, 1⅛ ounces of shot; sixteen-gauge, 1 ounce; twenty-gauge, ⅞ ounce; twenty-eight-gauge, ⅝ ounce; four-ten-gauge, ⅜ ounce. Using the same size shot, if these loads were spread out in patterns of equal density, their values are represented in an accompanying drawing.

These figures show the relative values of the gauges with the advantage lying with the "twelve" on down to the "four-ten." However, the larger the gun, the heavier and harder to handle it becomes.

There is hardly a doubt, however, that a twelve-gauge gun is *the* gun for a man who can afford to purchase but one gun. It is the

For Thrilling Sport Start Skeet Club

best all-around gauge for hunting, skeet and trapshooting.

Always endeavor to break your targets over station 8 where you have the full advantage of your pattern. If you shoot at a target too close, your pattern hasn't the spread; while shooting too late allows the pattern to spread too much.

Hitting Skeet Targets

The outgoer from station 1—This target comes from above the shooter's head from the high trap house, therefore must be shot under. The most common fault here is shooting *at* the target—not under it, because it is dropping by the time the shot-load reaches it.

The incomers from stations 1 and 7—These are the easiest shots on the skeet program—remember to cover the birds fully.

The outgoers from stations 2 and 6—Keep well ahead and under.

The incomers from stations 2 and 6—The lead should be a combination of lateral and upward. Don't follow too long.

Shots from stations 3 and 4—These call for increased lateral and decreased downward and upward leads.

Stations 5, 6 and 7—These targets vary but little from the corresponding stations on the other half of the semi-circle. They rise a little faster because of the low trap.

Outgoer from station 7—This is the only position that calls for a shot *at* the target. Shoot directly at the bird.

Station 8—A snap shot. The gun muzzle should just cover the mark and the trigger pulled on the instant. Generally considered the most difficult birds for beginners in skeet shooting.

Tips for Beginners

Don't venture into skeet without some previous instructions in gun handling.

Start shooting under the supervision of someone experienced.

Keep uppermost in your mind that all skeet targets traveling in a lateral direction must be led.

Try and keep both eyes open.

Wear glasses as an aid to vision whether you need them or not.

Be sure and keep your head on the gun stock.

Shoot from a position that feels most natural to you, but stand with shoulders leaning forward, and head as nearly in vertical position as possible. In other words, don't lean over on your stock.

On all cross shots, swing ahead and *keep* swinging.

Don't shoot too much. Here is a fault common with many beginners. On their first trial they become so enthusiastic over the sport they shoot more than they can afford. Limit your practice shooting to fifty shells. This is particularly sound advice to novices with shotguns, for their muscles will not withstand the recoil and bruised shoulders will result.

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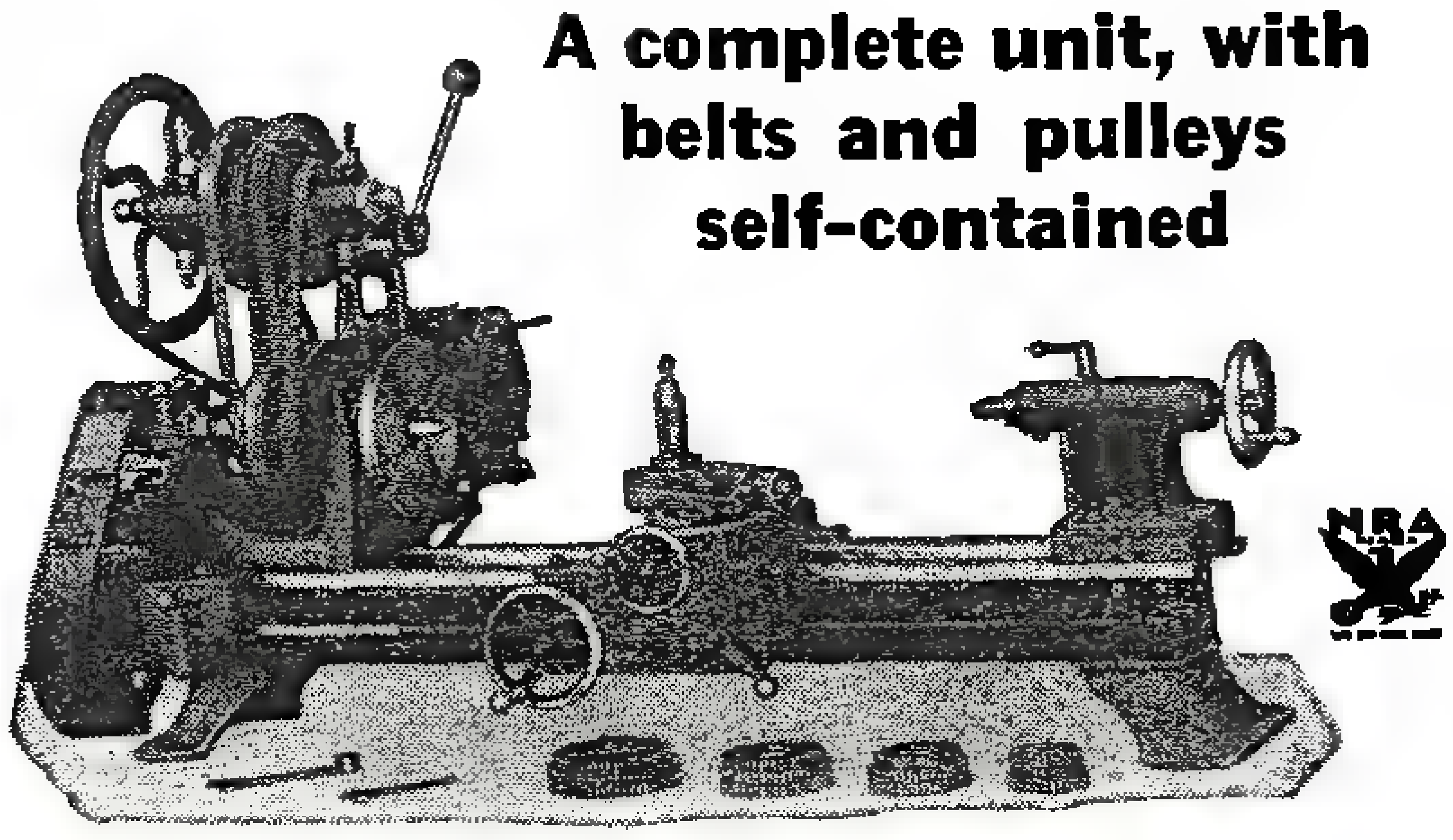

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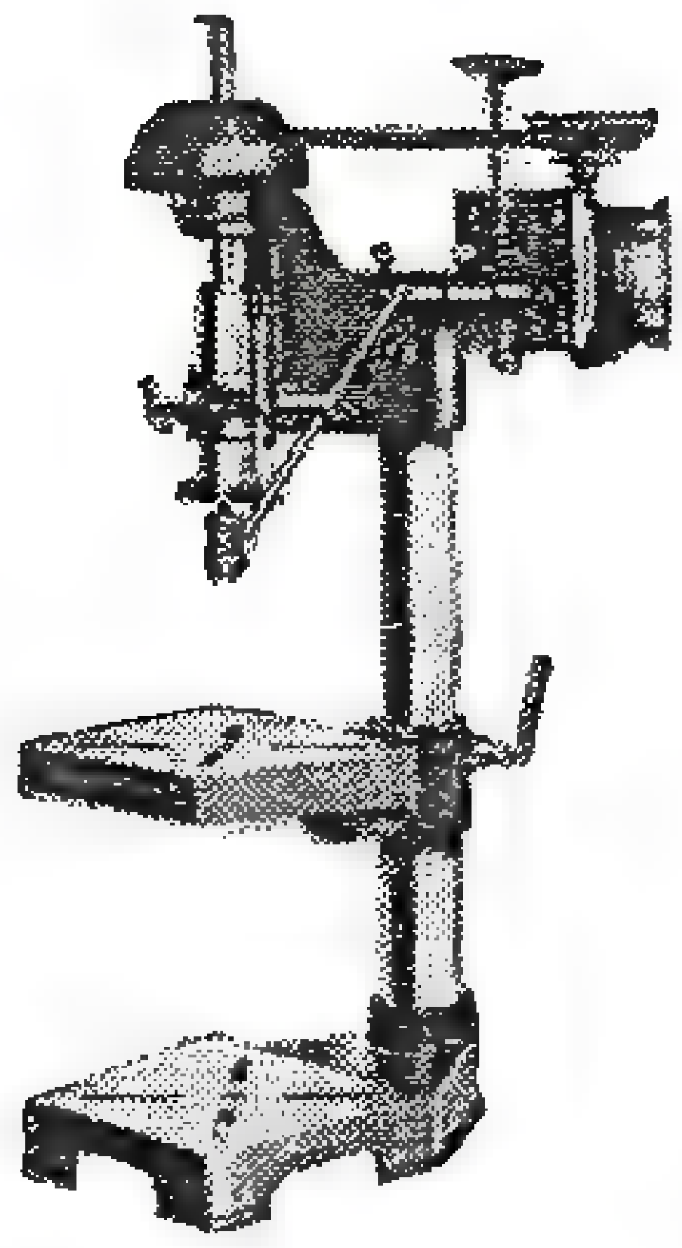

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Hockey—Fastest Game on Earth

(Continued from page 57)

left and right defense. As in basket ball, the wings are commonly called forwards and the defense men, guards.

The center is the key-man of the team. When the referee drops the puck at the "face-off" which marks the opening of each period, his job is to capture the frozen disk and shoot it to one of the wings who flashes down the ice toward the enemy's goal.

The guards, or defense men, are teamed with the goalie. Operating in the end zone, they are responsible for the protection of the goal. Should a fast-moving wing elude them, the goalie is expected to stop the flying puck with stick or body.

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Various other interruptions, penalties and fouls serve to confuse the spectator. The game may suddenly be halted and a player nowhere near the puck may be waved to the sidelines, forcing his mates to continue the battle shorthanded. In this instance, the referee has detected a violation of the rules and has penalized the team by putting the offending player out of the game for a given time.

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Major penalties are imposed for charging at an opponent from the rear, throwing a stick, body-checking (throwing an opponent to the ice), injuring another player by cross-checking (barring the way with stick held across body) or starting a fight.

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FOR INVENTORS And Mechanical Minded Men

How TO OBTAIN A

Answers to Questions

on Page 29

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2 Send sketch or model and description with search fee to a registered patent attorney.

3 1101 U. S.—1279 Foreign.

4 Abraham Lincoln.

5 17 years.

6 It confers on patentee the exclusive right to make, sell and use the invention covered by the patent.

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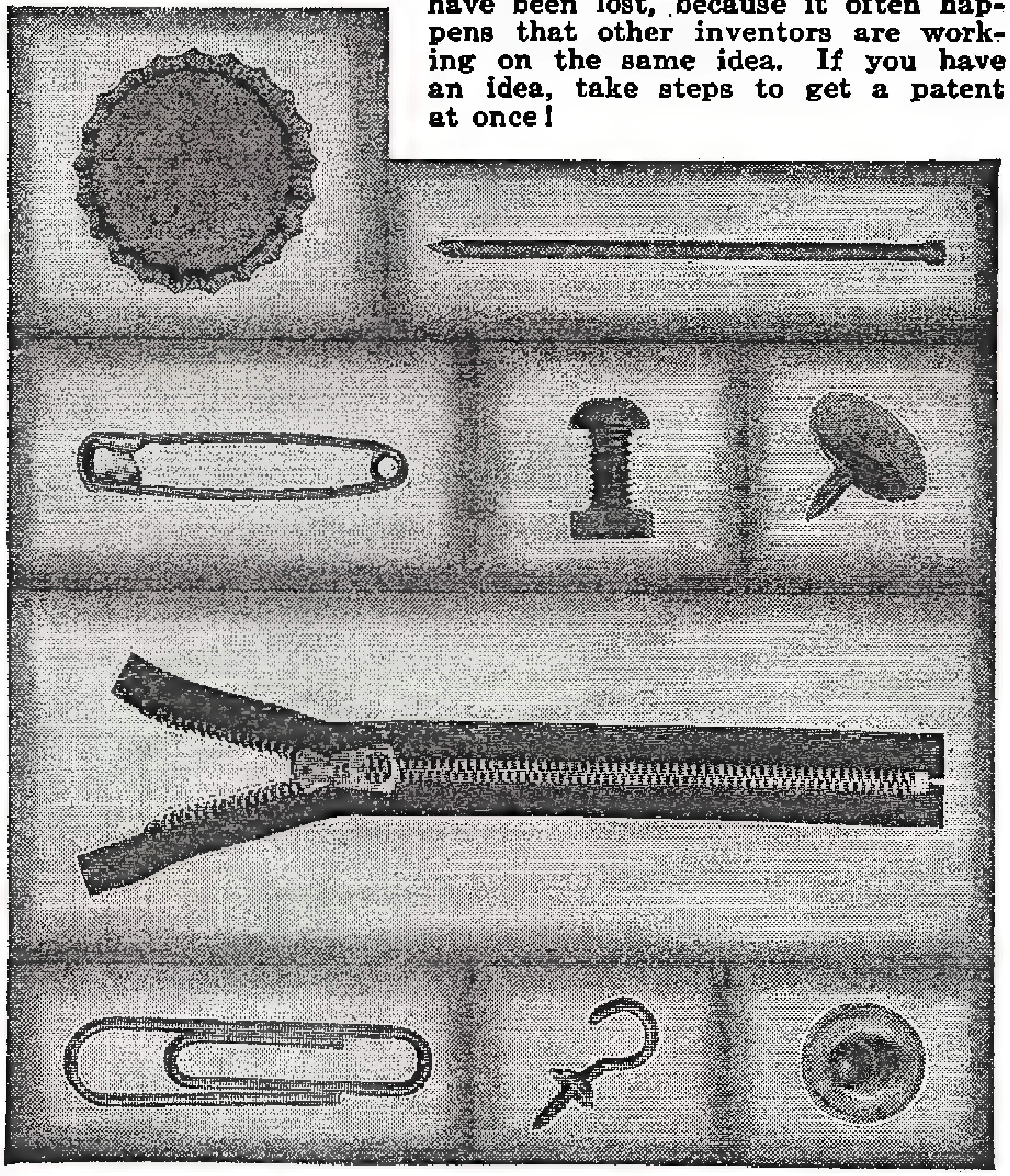

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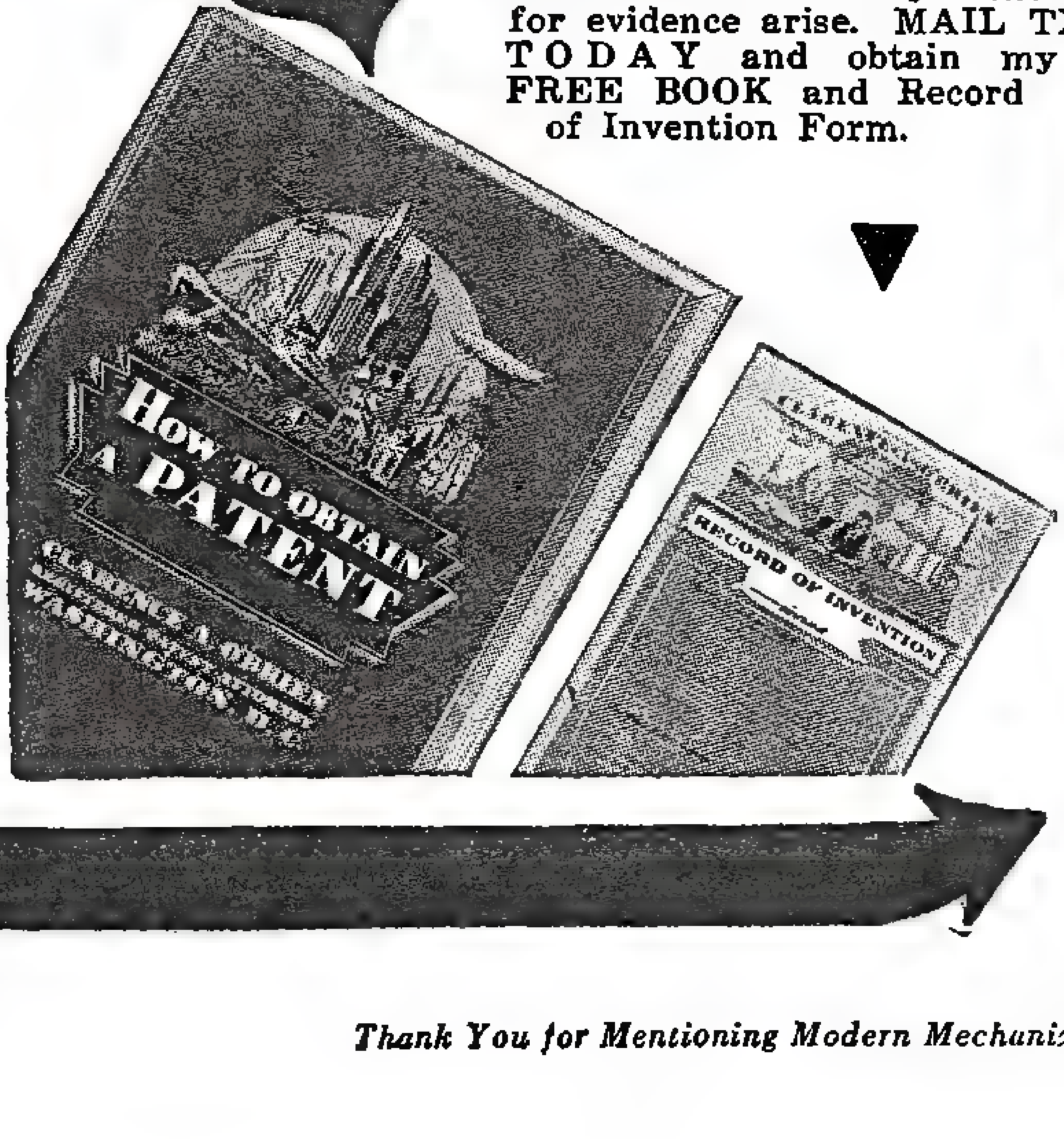

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29x5.00-19	2.85	1.05
30x5.00-20	2.85	1.05
28x5.25-18	2.90	1.15
29x5.25-19	2.95	1.15
30x5.25-20	2.95	1.15
31x5.25-21	3.25	1.15
28x5.50-18	3.35	1.15
29x5.50-19	3.35	1.15
30x6.00-18	3.40	1.15
31x6.00-19	3.40	1.15
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33x4½	3.45	1.15
34x4½	3.45	1.15
30x5	3.65	1.35
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Build World's Largest Earth Fill Dam

(Continued from page 60)

would cover the entire state of Connecticut to a depth of 6½ feet.

Because of the dam's earthen construction, no water will pass through or over the structure. Instead, the enormous head of water will be routed around the east side of the dam through four diversion tunnels with an inside diameter of 26 feet. Capable of carrying the entire flow of the Missouri at high stage, each of the tunnels will be equipped with two control valves, housed in shafts 242 feet high, reaching from the top of the bluffs to the tunnels below. To supplement the tunnels, a spillway about 3½ miles east of the dam site is to be built to carry unusually heavy heads of water.

Bridge to Become Dam's "Heel"

Over the downstream face of the dam the Great Northern railroad has erected a steel truss bridge for the transportation of dam materials over a special spur track from Wiota. About 9,000,000 tons of material, requiring about 4,000 50-car trains, will be moved over this bridge which will eventually become part of the dam's "heel."

Four factors prompted the building of the Fort Peck Dam: Flood control, river navigation, power production and irrigation. Of these, the first is most important. During the past century, disastrous floods along the lower Missouri have damaged agricultural lands to the extent of $75,000,000. The new dam will hold the ravaging waters in check and reclaim about 230,000 acres of swampy and untillable land whose potential value is estimated at more than $11,000,000.

In addition to ending the flood menace, the impounded waters, released as required, are expected to maintain a navigable channel in the Missouri river from 8 to 9 feet deep and 200 feet wide. This channel will open the Missouri to navigation for eight months of the year from Sioux City, Iowa, to St. Louis, Mo.

Provisions for Power Output

Power has been a secondary consideration in construction of the Fort Peck Dam; but under a normal head of 150 feet of water a hydroelectric plant is expected to deliver an output of 50,000 kilowatts. Provisions are being made for the installation of other units which will eventually deliver a power supply of more than 400,000 kilowatts.

No extensive irrigation plans have been made in view of the present government crop reduction program, but it is estimated that the dam can irrigate about 180,000 acres. About half of this acreage may be fed via a gravity flow canal; the other half by means of a pumping system which utilizes power available at the dam site.

The dam will span the Missouri at a point 23 miles southeast of Glasgow, Montana. Initial work on the huge project was started October 23, 1933. Engineers estimate that five years will be required to complete the vast undertaking; but once completed, the dam will last for a thousand years, harnessing the Missouri for the benefit of fourteen generations to come.

Workshop Hobbies Win Success

(Continued from page 34)

would like to cite a classic example of a plan which took years to formulate but which eventually was used to build something that helped to win a war.

In the early days of the Packard company, we manufactured comparatively few cars for the comparatively few buyers who demanded the precision and excellence of hand workmanship. Gradually, a few of us began to realize that many more people would buy Packard cars if we could devise machines which would do hand-precision work more cheaply and rapidly—in other words, if the manufacture of fine engines could be put on a mass-production basis.

Building Precision Tools

In the pursuance of our plan, we designed and built a diamond-edged drill, which cuts the bearing within precision limits of one ten-thousandth of an inch. This was more economical than the hand method, and actually produced a smoother, more perfect bearing. This method is almost universal among automobile makers today.

Our plan was finally ready, and we were on the point of putting it into operation when the tremendous events of 1914 interrupted it. The warring nations of Europe needed motor trucks. And for three years we built Packard trucks as fast as we could put them together. Then it became apparent to us that the United States, if drawn into the war, would need, more than anything else, a powerful, light airplane engine in great numbers. In other words, America would desperately need *mass production of a fine piece of machinery*—the very thing we had so carefully planned.

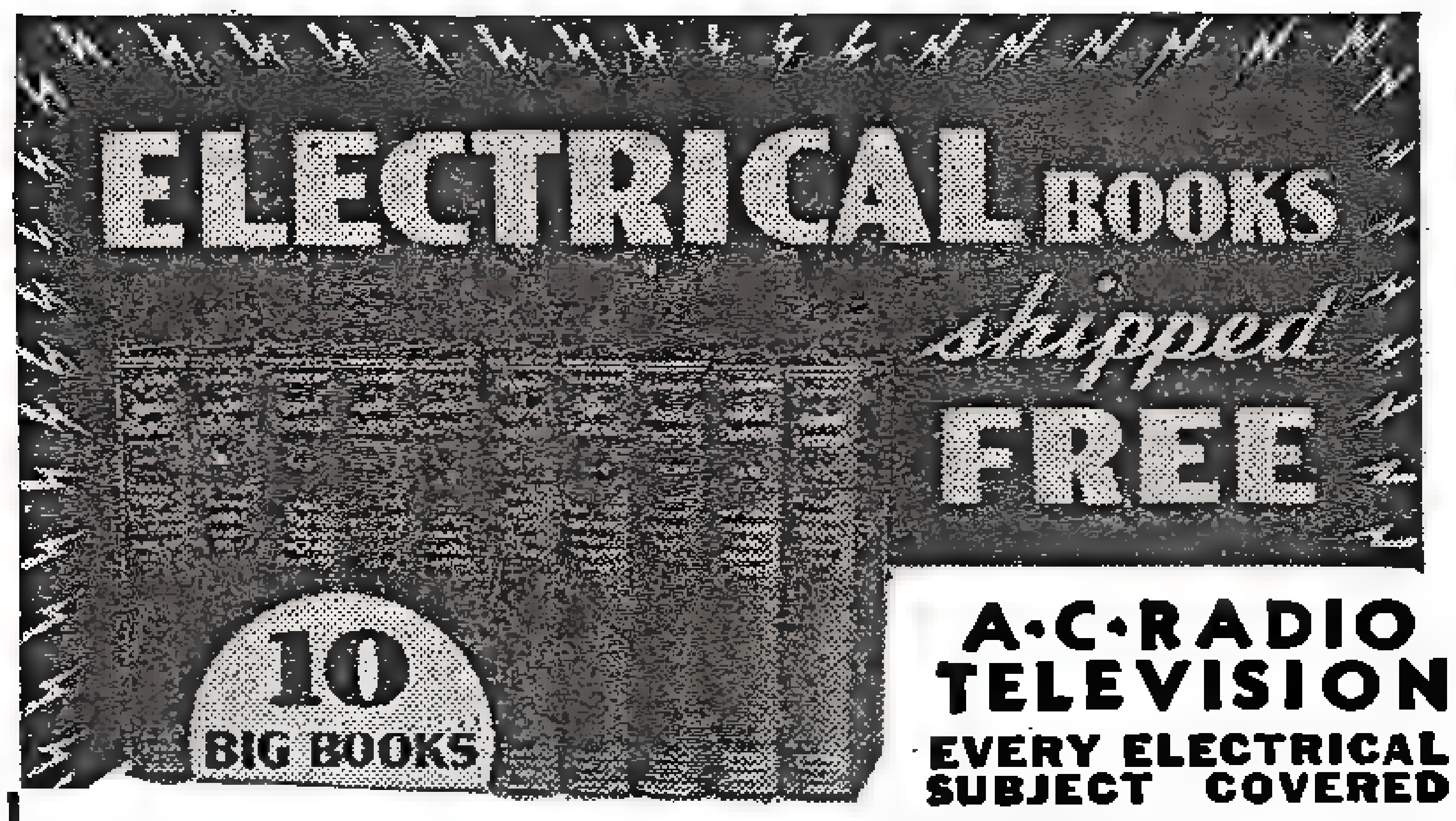
Birth of the Liberty Motor

The result was the development of the Packard "905", designed chiefly by Col. J. G. Vincent, vice president in charge of engineering. The "905" was a watercooled V-12, the most powerful aviation engine that had been produced in America, and the lightest, per horsepower.

When the American declaration of war came, we were ready. The plan for mass production of fine machinery was presented to the government, together with our designs for an all steel 12-cylinder aviation motor. From this design grew the famous Liberty motor. Using our production plan the government began to turn out these motors in half a dozen factories. And when the guns were once more silent on the western front, Marshal Foch declared that mass production of the Liberty motor had been a real factor in the victory. After the war the mass-production plan was at last applied to the building of Packard passenger cars.

My example has run to some length. But it will serve to show the importance of planning things in advance. And that is the big lesson anyone can learn from having a workshop in his home and building things with his own tools. Every time I go into my shop, the place says to me:

"If you would build, plan!"



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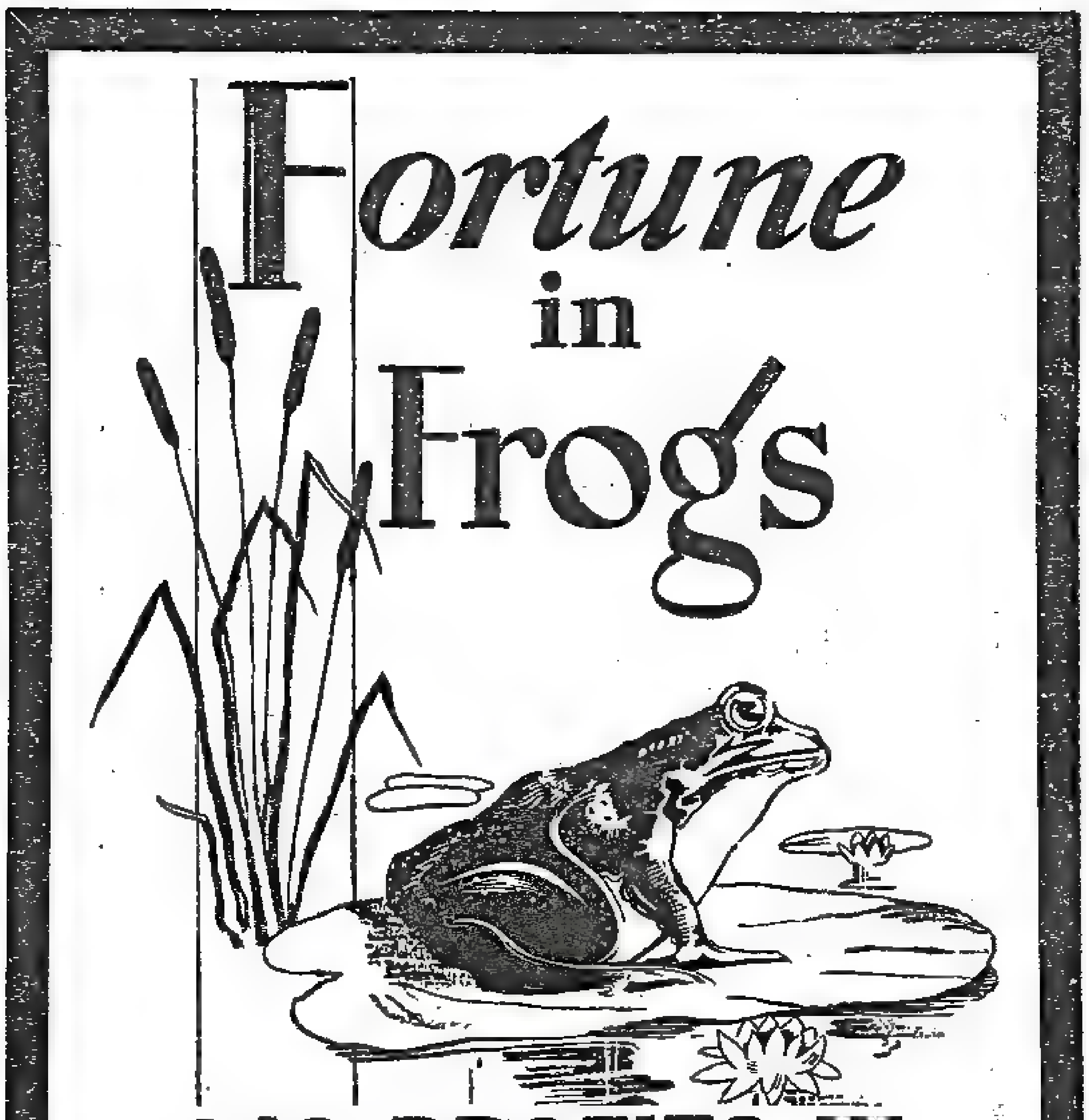

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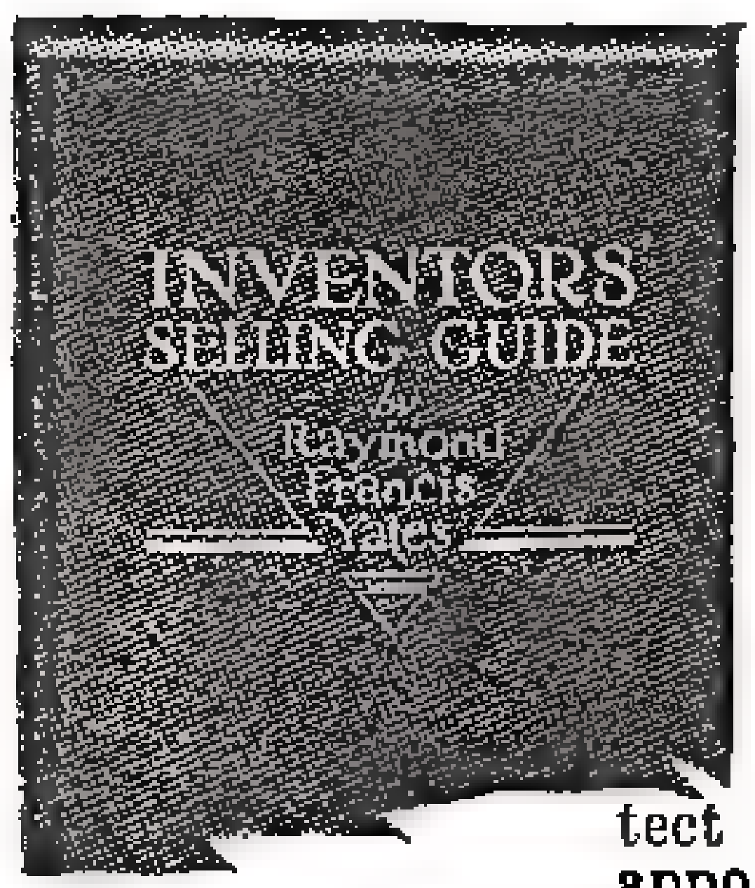

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SEE PAGE 12

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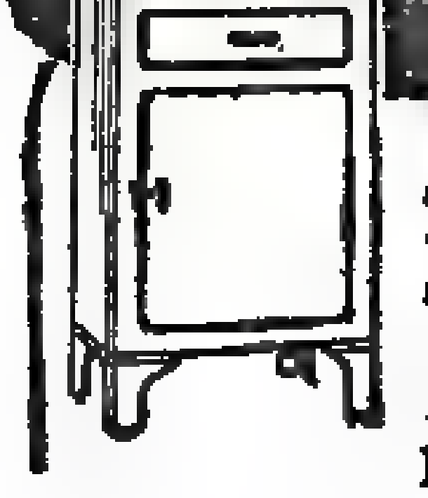

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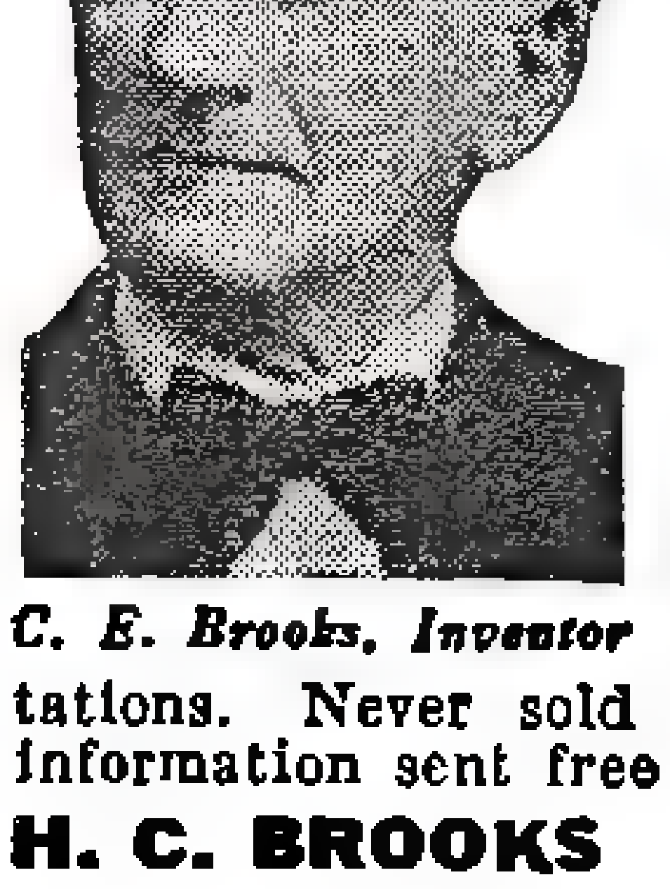

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Fortunes in Needed Inventions

(Continued from page 87)

automobiles. Families with two small youngsters would be quick to see the advantages of such a thing. It would be a fast selling number at one dollar each.

Looking at such a simple thing as a coat hanger one would never dream that this is one of the most inefficient things in use today. Men may not realize this fact but the ladies do. Due to the fact that female garments are lighter and have less body than do male garments, they will not remain in position on the coat hangers that we have today and many a lady goes to the clothes closet only to find her newest and most expensive gown lying on the floor in a wrinkled heap. The chap who can help the ladies out will be handsomely rewarded. There is needed a coat hanger that will also be a foolproof dress hanger.

During the past five years people, especially in this country, have become very conscious of such a thing as air conditioning. We have arrived at the psychological time for the introduction of an improved window ventilator that would permit a free entrance of air but that would at the same time prevent dust, rain and snow from entering, to say nothing of insects. The man who can supply the less fortunate families of America with a poor man's air conditioning system is sure to make a fortune.

Special Built Plane Wins Air Race

(Continued from page 40)

show how quickly passengers could be carried from Europe to Australia in comfort, they were given little chance of winning.

Yet the Douglas, carrying four passengers, including Miss Thea Rasche, noted German aviatrix, landed in Melbourne in second place after stopping at more than twenty cities, compared to the five stops of the British winner. Its feat led the London Evening News to hail the ship as the wonder of the race, stating "It gives irrefutable, tragic proof that we are miles behind other countries in commercial air transport."

The Boeing flown by Turner and Pangborn was also acclaimed because it, too, had made many stops at checking points along the way greatly increasing the distance flown.

The streamlined British racer with cramped quarters for only two pilots won by flying non-stop between the control points, disregarding checking points entirely. The British team arrived in Melbourne weary, bearded and grimy. They had had only two hours' sleep during the entire trip. In contrast the Dutch team and Miss Rasche arrived in Melbourne neat and refreshed.

The winning plane was one of three built by Capt. Geoffrey de Havilland, noted designer of the famous D. H. 4 World War planes. De Havilland built the ship especially for the race. He offered it to entrants for $25,000, but refused to reveal details of the "mystery" ship until it was completed. Purchasers knew only that the ship had two mo-

Special Built Plane Wins Air Race

tors, would seat two and would fly in excess of 200 miles an hour.

The three planes were entered in the race. One flown by Amy and Jimmy Mollison took an early lead in the race but lost it at Karachi and finally dropped out at Allahabad due to motor trouble. Scott and Black in their D. H. Comet overtook the Mollisons and held the lead to the end of the race. The third Comet, flown by Cathcart Jones and Ken W. Waller, was the fourth ship to land in Melbourne.

One remarkable feature about the new De Havilland is the low power motors. The racer was equipped with two special Gipsy Six motors each developing only 225 horsepower. In comparison the American Douglas was powered with two 700 h.p. Wright Cyclones, while the Boeing of Turner and Pangborn had two 550 h.p. Wasps.

The D. H. Comet is built entirely of wood, unusual in this day of metal ships. In the race it carried three-quarters of a ton of gasoline.

The Comet Earns Its Name

The estimated high speed of the new ship is 250 m.p.h. and with its full load of gasoline has a cruising range of 2,500 miles. The unusually thin, narrow tapering cantilever wing of the Comet does not exceed a depth of 11 inches.

Loaded, the Comet weighed 5,250 pounds, coming within the weight regulation of less than 5,400 pounds for the race. It also met the take-off requirement. Each entrant had to clear an obstacle 66 feet high 656 yards from the start.

The Dutch Douglas was a stock liner, unaltered for the race. Its cabin was sound proofed so that passengers and crew could carry on normal conversation and sleep in comfort. The ship will be used on K.L.M.'s airline from Holland to the Dutch East Indies. As a result of its performance in the race the Dutch company ordered ten similar planes for its air routes. In addition Douglas expects to sell 40 more to other transport companies.

The Boeing was a stock plane also, but its passenger seats were removed to provide room for additional gas tanks. When it weighed in, it was found to be overweight. To meet the weight requirements Turner had to tear out the sound proofing materials, seal up a 90 gallon gas tank, and replace the glass windows with composition material.

How the Prizes Were Awarded

The Dutch team was awarded first prize of $10,000 in the handicap race. Turner and Pangborn won second prize, $7,500, in the speed race. The Comet of Jones and Waller took third prize of $2,500 in the speed race, while another De Havilland, a Leopard Moth, flown by C. J. Melrose, placed second in the handicap race. and won $5,000.

In 1933 Wiley Post accomplished the amazing feat of flying around the top of the world, 15,400 miles, in slightly more than seven days. The winning plane in the Mac Robertson race could fly the same distance in four days! It could fly around the equator, 25,000 miles, in 6½ days.

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Seek Sunken Gold Near Broadway

(Continued from page 65)

mer, according to the engineers' predictions, the mystery of the *Hussar* will be solved.

Skillful engineering work and the science of diving are the important factors in the fight to recover the *Hussar's* gold. Simon Lake, 68, veteran inventor, is the master mind behind one of the corps of men engaged in the *Hussar* job.

He has invented and constructed a salvage submarine which is attached to a "mother ship" to use in the operations. Its main feature is an access tube, 115 feet long, equipped with hoisting apparatus.

The Lake salvage submarine itself is 22 feet long with a 9-foot beam which is connected by the access tube. The craft is fitted with a diving compartment through the door of which objects may be taken from the ocean bed or from which men in diving suits may leave to walk along the bottom or enter the holds and cabins of sunken ships.

Vacuum Tube Draws Up Treasure

The access tube is called a "vacuum cleaner" arm for dredging the ocean floor. When the *Hussar* undertaking is completed, the tube is going to be applied to sunken coal cargoes. Simon Lake says it will be capable of pumping up 300 tons of coal per hour.

"By the way," Simon Lake explained, "there is an incidental story concerning the *Hussar* which illustrates one of the obstacles in picking up your fortune from the bottom of the ocean.

"I've been collecting data about the old ship since 1884, when, as a boy, I sat on the bank of the East River and watched the old side-wheeler *Chester* go through the motions of reaching the wreck. They sent divers down every time the currents there got tired and slacked off their pushing.

"When the story got out a short time ago that I had asked the United States government for a contract to salvage the *Hussar*, I got a letter from one of the divers employed by the *Chester*.

2,000 Ships Sunk Each Year

"This diver wrote to ask for a job with me and explained he had superior qualifications since he had not only found the ship but had handled some of the gold on it to make sure it was there. He added that he had not told his employers about it because he wanted to get the contract himself and have the treasure all for his own.

"There are," concluded Mr. Lake, "an average of 2,172 vessels sunk a year in all the waters of the world. Figure out for yourself how much gold is waiting on the floor of the seven seas—lying there untouched."

Although Lake asserts that he has a permit to salvage the *Hussar* from the United States Treasury Department, with an arrangement that the government is to receive 10 per cent of the trove and income tax revenue from it, his two rivals were also granted permits from the Coast Guard.

Minor C. R. Keith, internationally famous sportsman, yachtsman and veteran of scores of engineering feats in the tropics, has

Seek Sunken Gold Near Broadway

sponsored with his funds a second crew searching for the *Hussar's* gold. Mr. Keith's grand-uncle was the founder of the United Fruit Company.

While the illustrious Mr. Lake is counting on his salvage submarine for success, the Keith forces are banking their hopes on a new diving suit and one of the most expert divers in the country. He is Roy Hansen, who worked on the raising of the U. S. Submarines *S-4* and *S-51*. He said he particularly wants to find the treasure so that he can take his share and retire from the occupation which killed both his father and his grandfather.

Thomas P. Connelly, president of the Empire Marine Salvage and Engineering Corporation, explained the special diving suit.

Details of Special Diving Suit

"This deep-sea diving suit," he said, "is made of steel and manganese bronze. The arms and legs are flexible, thus allowing a diver not only the use of his arms and claws to work with, but also to walk as well.

"It is built of sufficient strength to enable a diver to work in it at a depth of 1,000 feet, or more if necessary. The suit carries its own air supply, and therefore does not require the use of the customary air line.

"It weighs 675 pounds and has a massive body and head of steel with glass-covered openings for eyes which are at the ends of short steel protuberances jutting out from the head. The diver takes down with him a bottle of 1,250 pounds of oxygen, which is to be used only in an emergency."

Hansen keeps in touch with the "mother" tug *Terminal* by telephone. His suit is equipped with three 5,000 watt electric lights, one on each arm and a third on the head, which enable him to see about five feet in the murky waters of Hell Gate. The suit is roomy enough to supply him with air for about an hour. A caustic-soda respirator permits him to breathe this same air over and over again for six hours. The extra oxygen tank is carried in one of the legs.

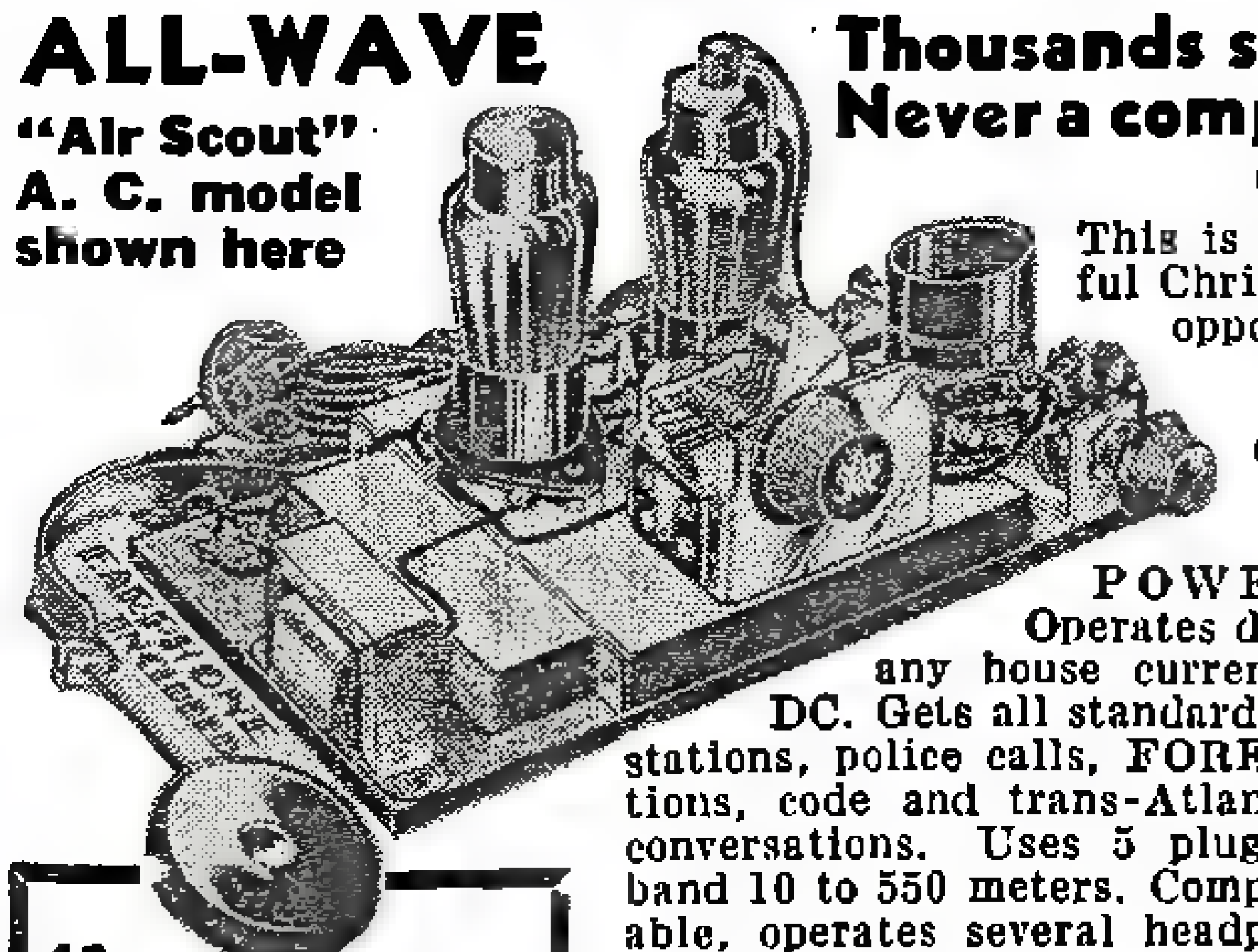
Part of Wreck Believed Found

The *Terminal* drops Hansen over the side with 2,000 feet of cable by which it drags him along against the strong tide. In a week he located six wrecked ships, none of them the *Hussar*.

The third competing expedition is headed by R. T. Powell, former engineer, inventor and real estate man. He is using a yacht converted into a regular salvage ship with ordinary diving equipment and expert divers.

His chief diver is Anton Schacht. Schacht reported the finding of a piece of timber about 50 feet long and four feet wide, which his associates believed was part of the *Hussar*.

If anyone except Lake recovers the *Hussar's* treasure, there's going to be a merry court fight, as a judge will then be asked to decide who is rightfully entitled to the gold. Lake claims his rights are superior to those of the Keith and Powell outfits. They are countering that they were on the scene before him.



ALL-WAVE
"Air Scout" A. C. model shown here

Thousands sold—Never a complaint!

●

This is a wonderful Christmas gift opportunity — **act QUICK!**

POWERFUL! Operates direct from any house current, AC or DC. Gets all standard broadcast stations, police calls, FOREIGN stations, code and trans-Atlantic phone conversations. Uses 5 plug-in coils, band 10 to 550 meters. Compact, portable, operates several headphone sets simultaneously.

10c to cover printing and postage, brings you valuable data on ALL-WAVE receivers. Send at once.

Complete with 2 tubes, earphone, 2 coils covering band from 70 to 550 meters, ready to plug in and use........ **$8.50**

Battery operated ALL-WAVE "Air Scout" complete with tube, earphone, two coils, data instructions, assembled, wired, ready to use, NOTHING ELSE TO BUY except inexpensive batteries ... **$5.95**

Same as above, but in kit form.... **$5.00**

Amplifiers for both battery and electric sets . . . write for details.

WOW!

"Air Scout Midget" Portable All-Electric With One 2-in-1 Tube In Metal Case.

Smallest, lightest and simplest in the world, but what a PERFORMER! Size 10x4½ by 3½ inches. Weight only 3 pounds. Uses standard AIR SCOUT plug-in coils and covers band from 10 to 550 meters. Works from any 110-volt a. c. or d. c. lighting circuit. Brings in broadcast and short wave stations on short length of wire. Carry it anywhere! Complete with earphone, tube and all 5 coils.

$10.00 Post paid

Send check, money order, or bills

HAMILTON SPECIALTY COMPANY
Dept. M.M. 135 Lockwood Ave. New Rochelle, N. Y.

Grow Mushrooms
IN YOUR CELLAR OR SHED

Make Money at Home

Grow our famous Fancy White Queen Mushrooms. Exclusive new process. Bigger, better, quicker crops. More money for you! Enormous new demand. Illustrated book free. Write today!

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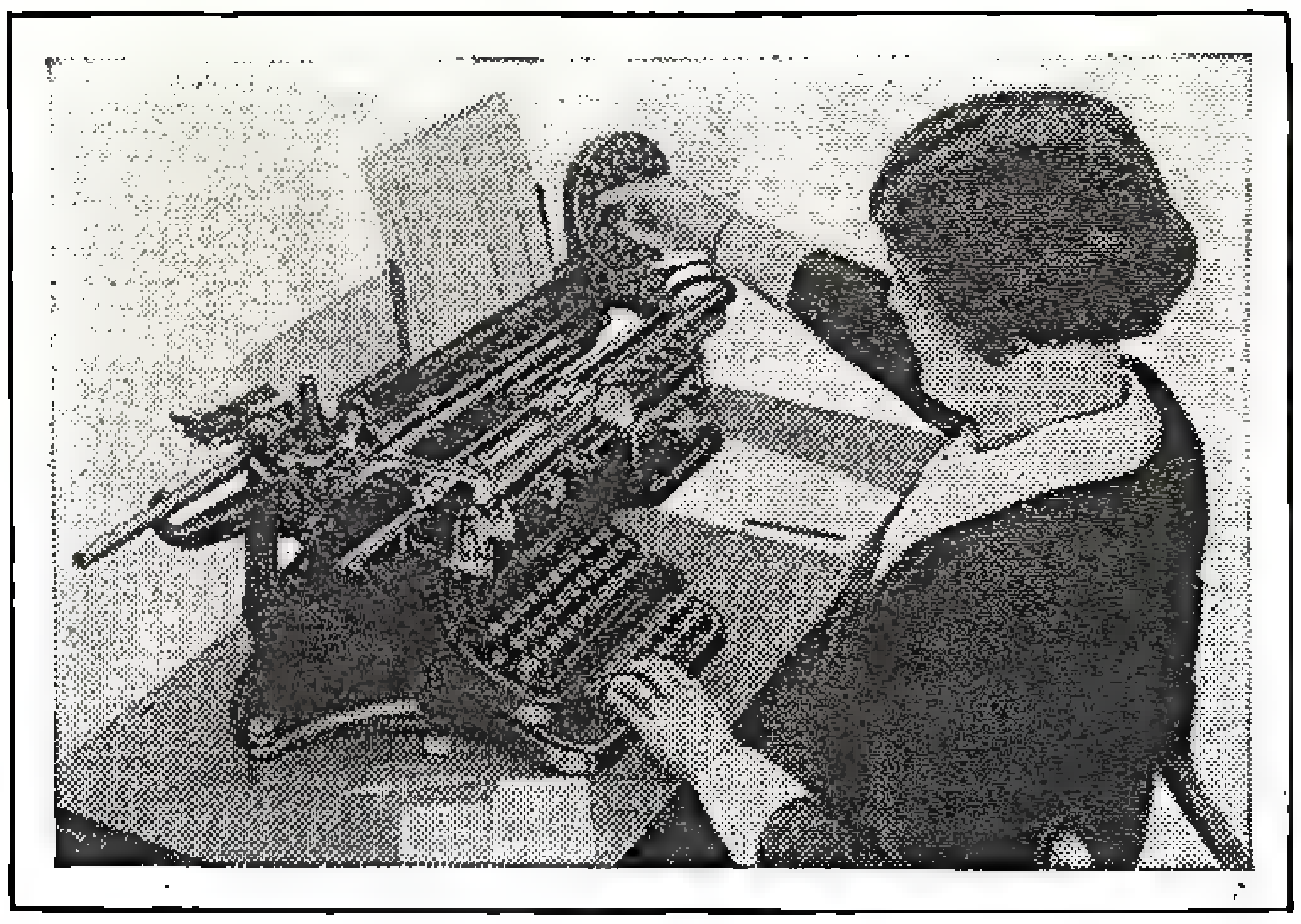
BUSINESS Welcomes NEEDED GADGETS



An adding machine, bookkeeping machine, and typewriter all in one is this new German invention. Telephone-like dial automatically shifts the paper to any desired line on sheet. Left hand of girl rests on adding machine keys.

Motor cleaning fluid which is poured into an auto engine through the spark plug openings is said to clean out carbon deposits overnight.

Bottle cap with a new measuring cone permits accurate pouring of the correct medicinal dose without using a spoon or dropper.

Centrifugal water pump powered by 10 h.p. outboard engine is designed for fire fighting, small irrigating jobs, or even for pumping dirty, sand-laden water.

Combination sofa-bed has ash trays and bookshelves built into wide, cushioned arms.

Electric turntable for store windows, powered by small electric motor, runs at 4 revolutions a minute, and costs less than 2 cents a day for power. It will support displays weighing up to 10 pounds.

Radio test leads with interchangeable points permit use of either needle or blunt point when testing radio apparatus.

Grease guns using cartridge refills eliminate messy filling from cans when greasing automobiles. Factory-loaded 1-lb. grease cartridge is slipped into gun. Single gun serves for full greasing operation, since cartridges are interchangeable even when partly empty.

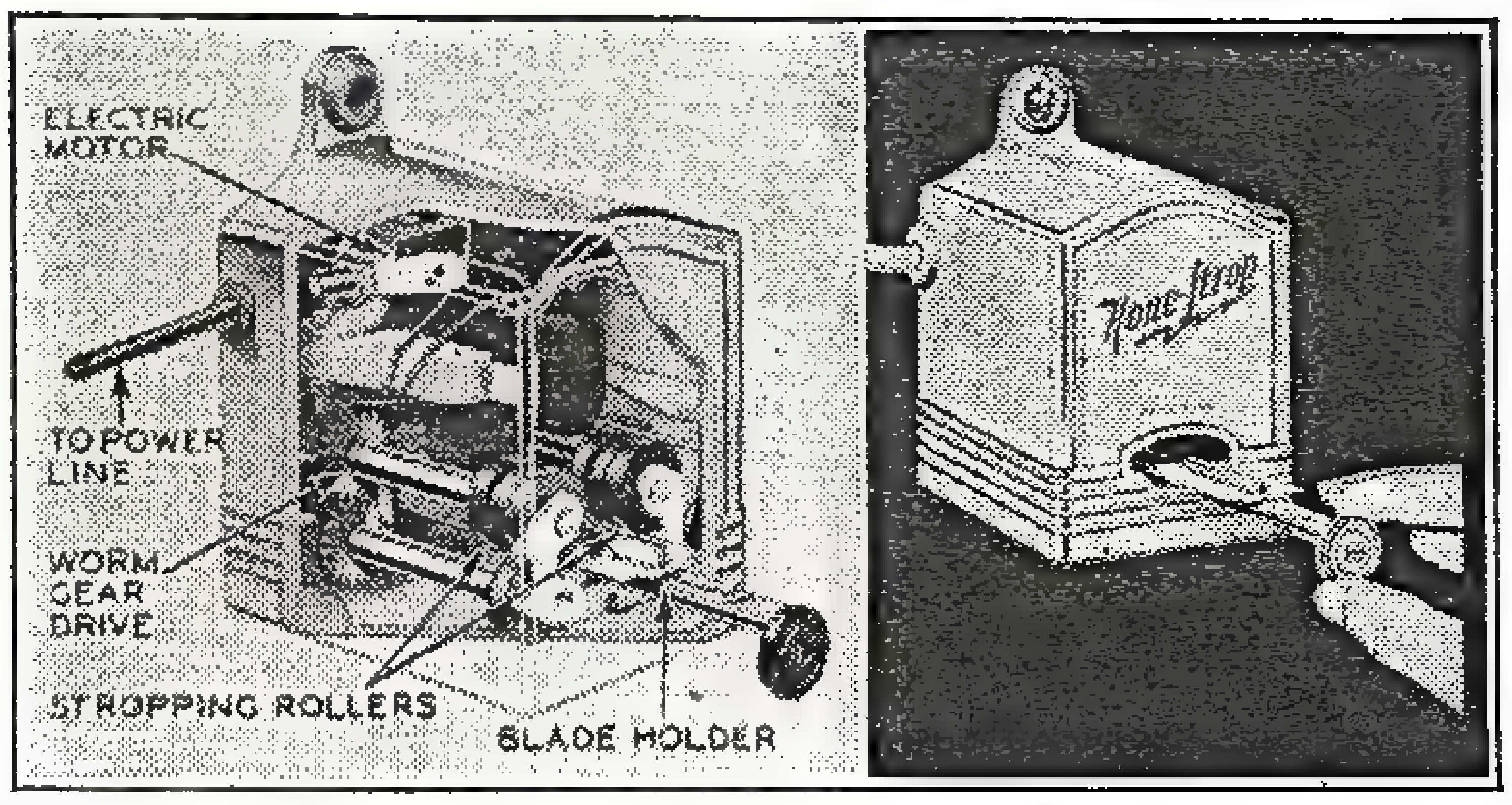
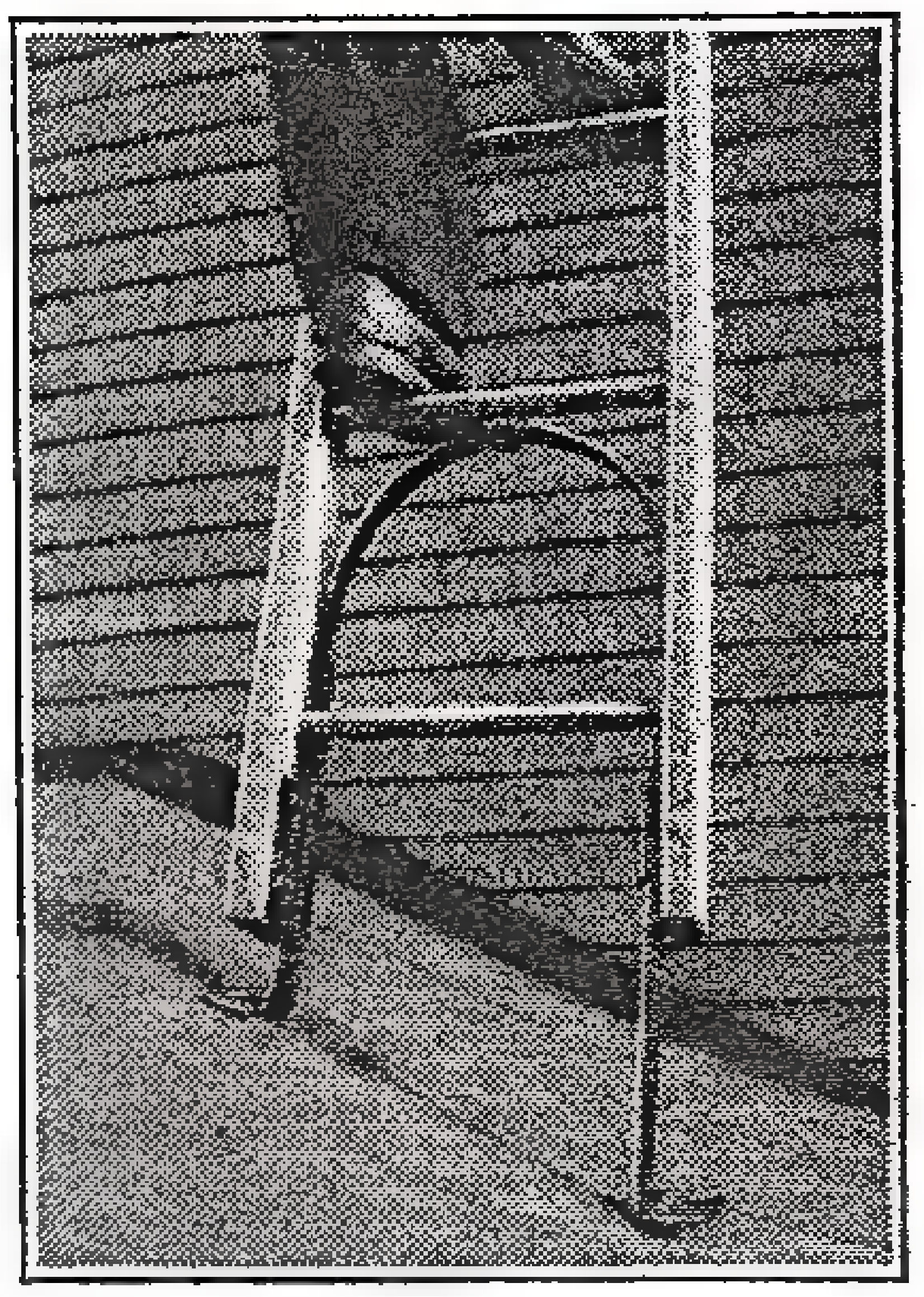


Photo at left shows construction of electric hone device designed to sharpen both edges of razor blade at same time. Motor starts automatically as blade is pushed into device.

Short-wave tuning oscillator attachable to any all wave radio receiver gives pleasing tuning signal tone to help find distant stations. Signal tone disappears when the switch is thrown, leaving the desired station accurately tuned in.

Electric lighting plants in 300 to 2000 watts capacity provide flickerless 110 volt, 60 cycle current for lake cottages and farm homes. Gas engine, starter, governor, and generator are all combined in one compact unit.

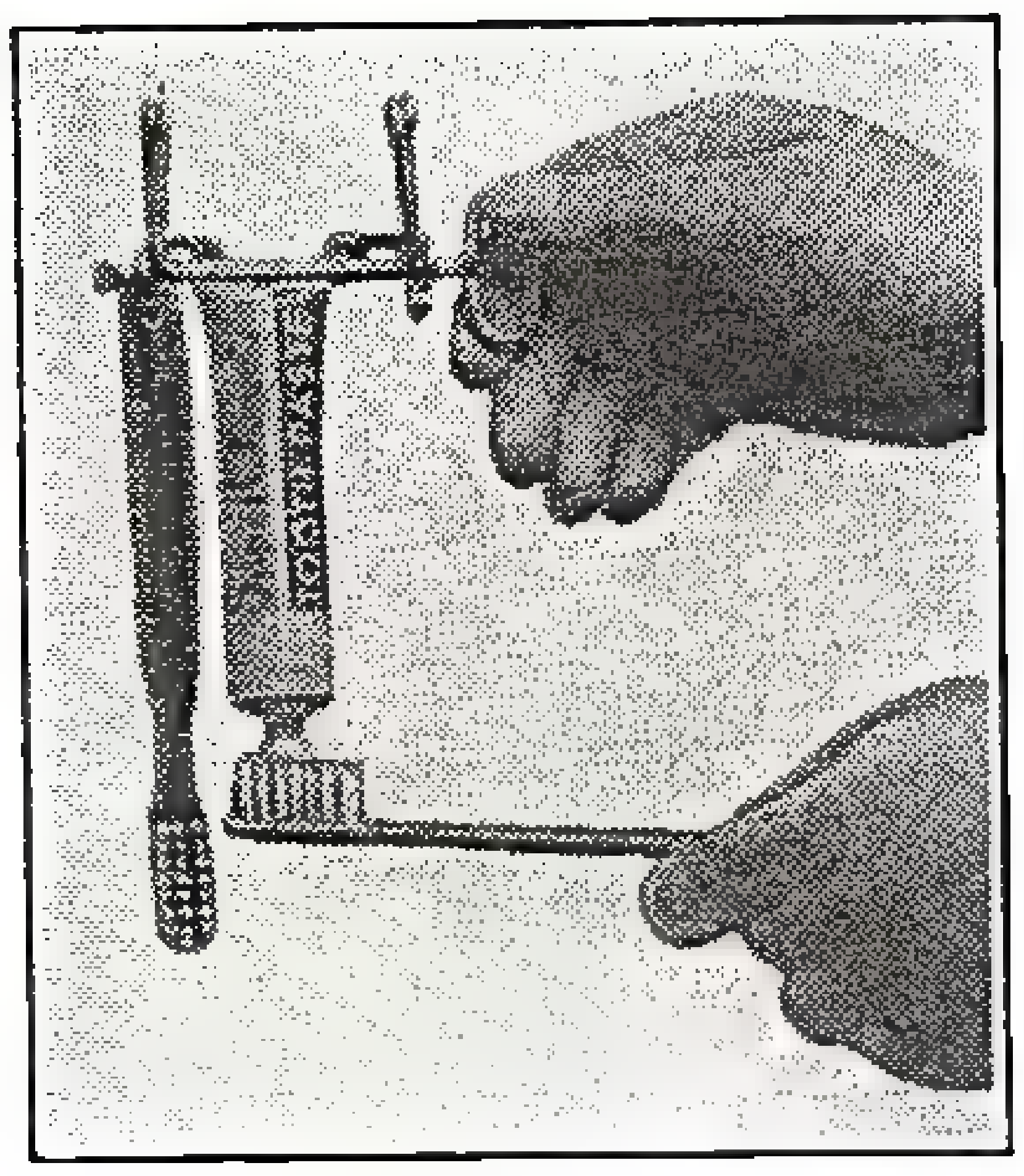


Attachable to any ladder in few minutes, new ladder leg adjusts automatically to all uneven surfaces, including steps. Steel springs operate equalizer.

New fisherman's aid permits trolling at any depth without the use of heavy sinkers. Sliding weights on the device reverse the action of the troller to bring the fish to the surface after a strike.

Projector for 16 mm. film throws 15'x20' pictures brilliant enough for theater or auditorium use. A 1000-watt light combined with a highly effective optical system makes this exceptional performance possible.

Vertical spindle wood shaper selling at less than five dollars operates from any motor over 1/10 h.p., and cuts a variety of bevels, moldings or grooves. The spindle is readily adjusted on the metal frame for a new cut.



Toothbrush holder and paste dispenser conveniently attaches to wall. Turn of the handle at right forces the paste out.

Magazine loading razor contains 20 blades; blades are changed instantly when necessary without touching them. The angle of the blade to the handle changes constantly with use, to conform to the contours of the face.

Cigarette package opener slices out small hole in end of package with one movement of operating lever.

Editor's Note—A mimeograph list of manufacturers' addresses for these and other new products in this issue can be obtained by sending a stamped, addressed envelope to MODERN MECHANIX AND INVENTIONS, *529 South 7th St., Minneapolis, Minn. Manufacturers and inventors are invited to submit photos and literature for this page.*

Amazing New Discovery

REFINISH AUTOS LIKE NEW!

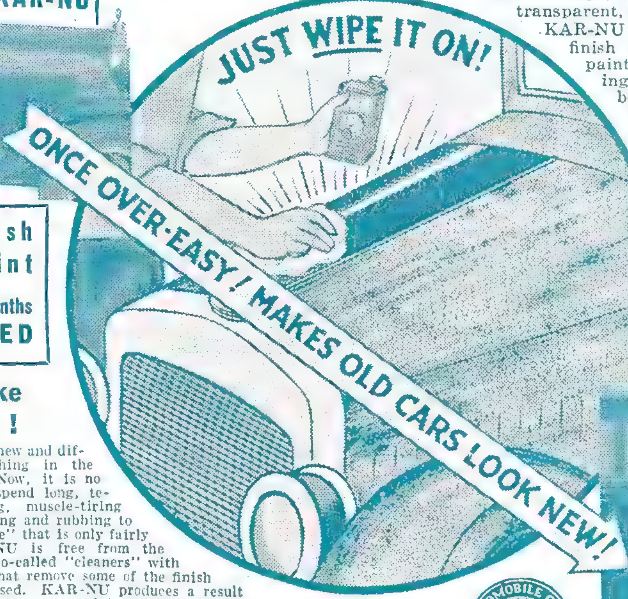
No Polishing-Waxing-Rubbing or Painting

KAR-NU

PAYS YOU UP TO $7.00 IN AN HOUR!

KAR-NU is a new, miracle discovery—a transparent magic-like fluid with which anyone can refinish any color automobile easily, quickly and economically without polishing, waxing, rubbing or painting. JUST WIPE IT ON WITH A CLOTH! IMMEDIATELY the dullness, the discoloration, the shabbiness, the sunfade DISAPPEAR. INSTANTLY, as if by magic, the old paint is covered with a tough, elastic coat which is absolutely transparent, self-levelling and self-polishing. KAR-NU fills up the pores of the old finish and actually rebuilds it. The paint or Duco is rejuvenated, giving it the lustre, life, glow and beauty of the original factory finish. As KAR-NU dries it seals the pigment and protects the finish from further wear. Lasts 8 to 12 months. GUARANTEED.

BEFORE USING KAR-NU


JUST WIPE IT ON!
ONCE OVER-EASY! MAKES OLD CARS LOOK NEW!

WOW!
LOOK NOW AFTER USING KAR-NU!

NOT a Polish Wax or Paint

Lasted 8 to 12 Months GUARANTEED

Works Like MAGIC!

KAR-NU is entirely new and different—there is nothing in the world just like it. Now, it is no longer necessary to spend long, tedious, back-straining, muscle-tiring hours polishing, waxing and rubbing to produce a "mere shine" that is only fairly satisfactory. KAR-NU is free from the labor and danger of so-called "cleaners" with acids and abrasives that remove some of the finish each time they are used. KAR-NU produces a result that is equal in beauty to a repaint or refinishing job which costs $25.00 to $75.00. Stands blazing sunshine and engine heat, rain, snow and below zero temperatures, repeated car washings.

This Seal of Approval awarded by the Automobile Club of Illinois shows that KAR-NU is a product of merit and does all we claim for it.

Tested and approved by the Automotive Test Laboratories

OTHER USES

Besides refinishing automobiles, KAR-NU has hundreds of other uses in the home, office, factory, store and shop. It refinishes typewriters, adding machines, cash registers, scales, desks, chairs, file cabinets, furniture, book cases, safes, etc.—in fact anything made of metal on which the original finish has become dull or discolored.

Quick Sales! Sensational Profits!

Enormous demand! Millions want it! W. L. Morgan, of Mass., earned $10.61 in a single hour. Sell to individuals, fleet owners, garages, auto accessory stores, used car dealers, etc. No experience necessary. Send no money for sample and details. Get in on ground floor. Just mail coupon—NOW.

DEALERS—Write For Name Of Nearest KAR-NU Distributor

KAR-NU CO., Dept. E-41, Oakley Station, CINCINNATI, OHIO

FREE SAMPLE COUPON

KAR-NU CO., Dept. E-41,
Cincinnati, Ohio

RUSH FREE SAMPLE to prove your claims about KAR-NU, and Territory offer.

Name ....

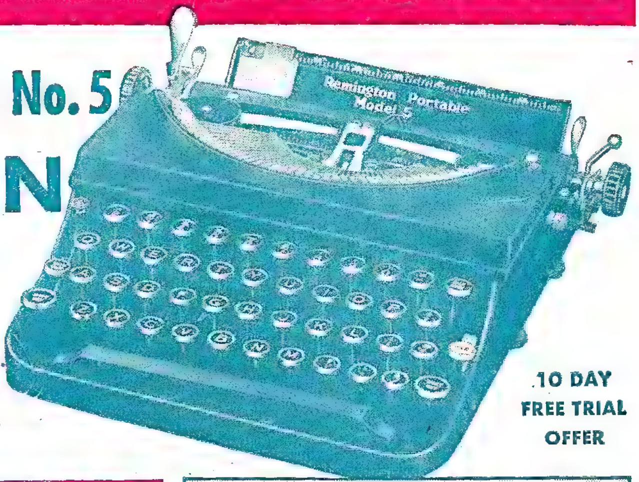
Address ....

Town .... State........

ANNOUNCING AMAZING
TYPEWRITER BARGAIN

BRAND NEW MODEL No. 5
REMINGTON PORTABLE
10¢ A DAY

MONEY BACK GUARANTEE



**10 DAY
FREE TRIAL
OFFER**

BIG PRICE REDUCTION

● Positively the greatest portable typewriter bargain ever offered! Now for the first time Remington, world-famous manufacturer, offers a NEW purchase plan ... only 10¢ a day buys this latest model machine! Not a used or rebuilt typewriter. Not an incomplete machine. A beautiful brand *new* regulation Remington Portable. Standard 4-row keyboard; Standard width carriage; margin release on keyboard; back spacer; automatic ribbon reverse; *every essential feature found in standard typewriters!*

Money making opportunities always open

Hundreds of jobs are waiting for people who can type. A typewriter helps put your ideas on paper in logical, impressive form.. helps you write clear, understandable sales reports, letters, articles, or stories. A Remington Portable has started many a young man and woman on the road to success.

A Gift for Every Member of the Family

If you want a gift for birthday, Christmas, or graduation . . . one that Father, Mother, Sister or Brother will use and appreciate for years to come . . . give a Remington Portable. It's the one gift that can be used with both pleasure and profit by every member of the family.

ACT...WHILE LOW PRICE HOLDS GOOD!

New wage scales in our own factories, and in the factories of the companies which make our materials, point definitely to higher prices. Stocks of machines on hand make possible the present unbelievably low cash price on this machine. Everything points to higher prices. We don't believe that we can maintain the present big price reduction in the face of constantly rising costs in every one of our departments. So we say "Act fast!"

10 DAY FREE TRIAL OFFER

You can try this machine for 10 days without risking one penny of your money. *Not even shipping charges.* Send for complete details on this most liberal offer. Get attractive new catalogue illustrating and describing the many Remington models available on unusually low terms. Clip coupon today!

EVERY ESSENTIAL FEATURE found in Standard Machines

Buying a typewriter isn't like buying a suit of clothes. Many Remington portables, seeing 10 years of hard service are still in active use. When you buy...buy a machine with every *standard* feature. The Remington No. 5 is the most compact and durable portable ever built...includes all essential standard typewriter features. This beautiful machine represents the height of economy . . . unequalled economy in first cost . . . unequalled economy in service.

It is today the best value ever offered in typewriter history . . . and that statement comes from the company that has constantly *made* typewriter history. Buy now. It is a real bargain offer.

Specifications . . .

The Model 5 includes every essential feature found in standard typewriters. It has standard 4-row keyboard, Complete visibility, Standard width carriage for long envelopes. Carriage return lever of exceptional design for easy and rapid operation. Margin release on the keyboard. Automatic ribbon reverse. Back spacer. Two color ribbon shift.

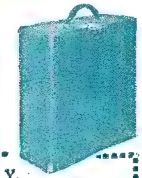
Variable line spacer. Adjustable margin stops. Auto set Paragraph Key (one of the most useful features found on any typewriter). Weight 11 lbs. 13 oz. Furnished with Pica or Elite type.

TYPING COURSE FREE

When you get your new Remington No. 5, you will get with it ... ABSOLUTELY FREE ... a 19-page course in typing. It teaches the Touch System, speeds up work. It is simply written and well illustrated. Instructions are easy as A.B.C. Even a child can understand this method. A little study and the average person, child or grown-up, becomes fascinated. Follow this course during the 10-DAY FREE TRIAL OFFER that we give you on your typewriter. At the end of that time, you should be able to dash off letters faster than with pen and ink.

CARRYING CASE FREE

With every Remington No. 5, a FREE carrying case sturdily built of 3-ply wood. Covered with heavy DuPont fabric. Top is removed in one motion, leaving machine firmly attached to base. Can be used anywhere . . . on knees, in chairs, on trains.



REMINGTON RAND INC., DEPT. 141-1 BUFFALO, N. Y.

CLIP COUPON NOW

Remington Rand Inc., Dept. 141-1 Buffalo, N. Y.

Please tell me how I can buy a new Remington Portable typewriter for only 10¢ a day. Also enclose your new catalog.

Name ______________________________

Address ______________________________

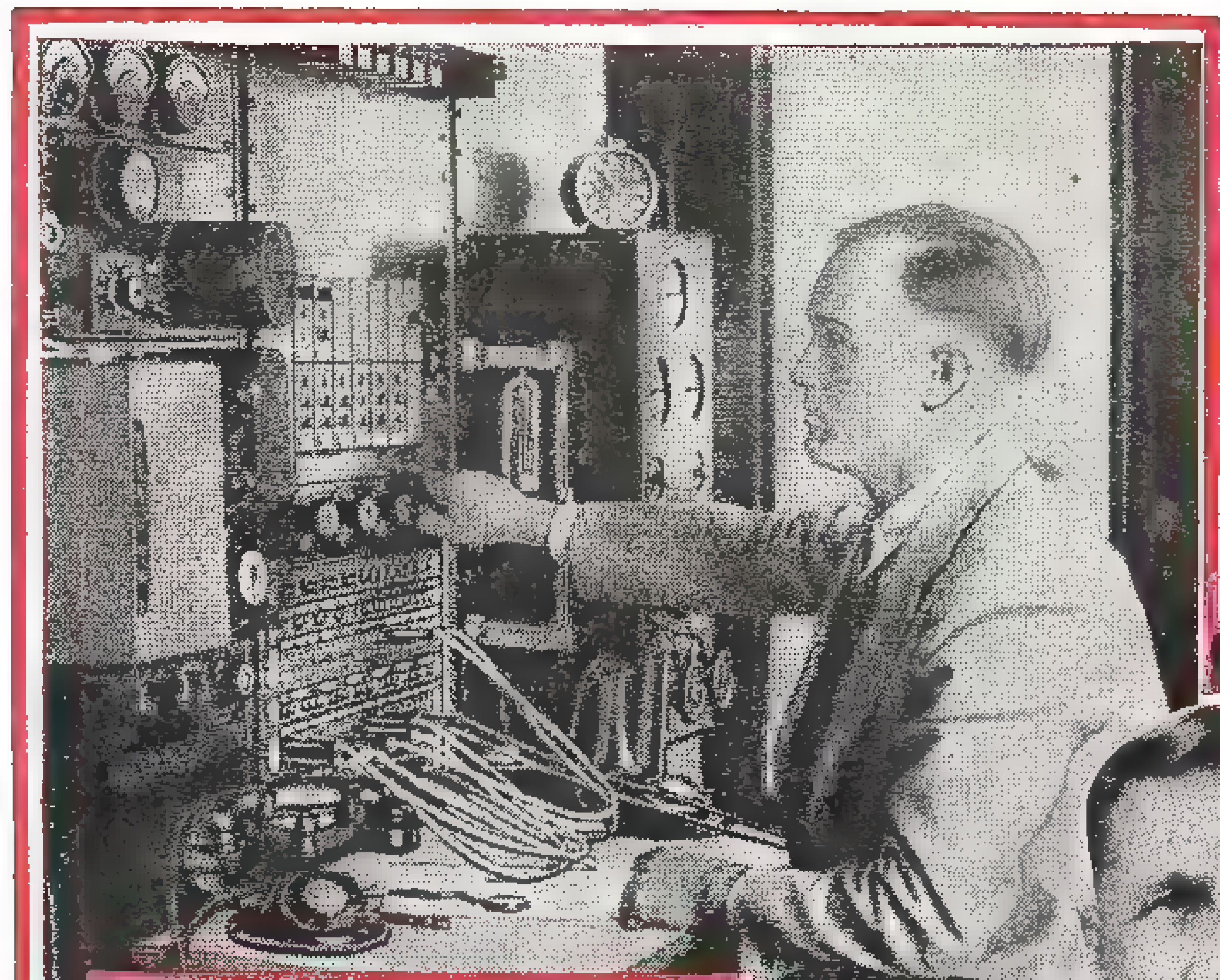
City ________________ *State* ____________

Double Page Spreads

BE A RADIO EXPERT

MANY MAKE $40 $60 $75 A WEEK

I'll train you at home • Mail coupon for FREE PROOF



Broadcasting Stations
Employ managers, engineers, operators, installation and maintenance men for jobs paying up to $5,000 a year.

Loud Speaker Apparatus
Installation and service work is another growing money-making field for trained Radio men.

J. E. Smith
Pres. National Radio Institute
The man who has directed the Home Study Training of more men for the Radio industry than any other man in America.

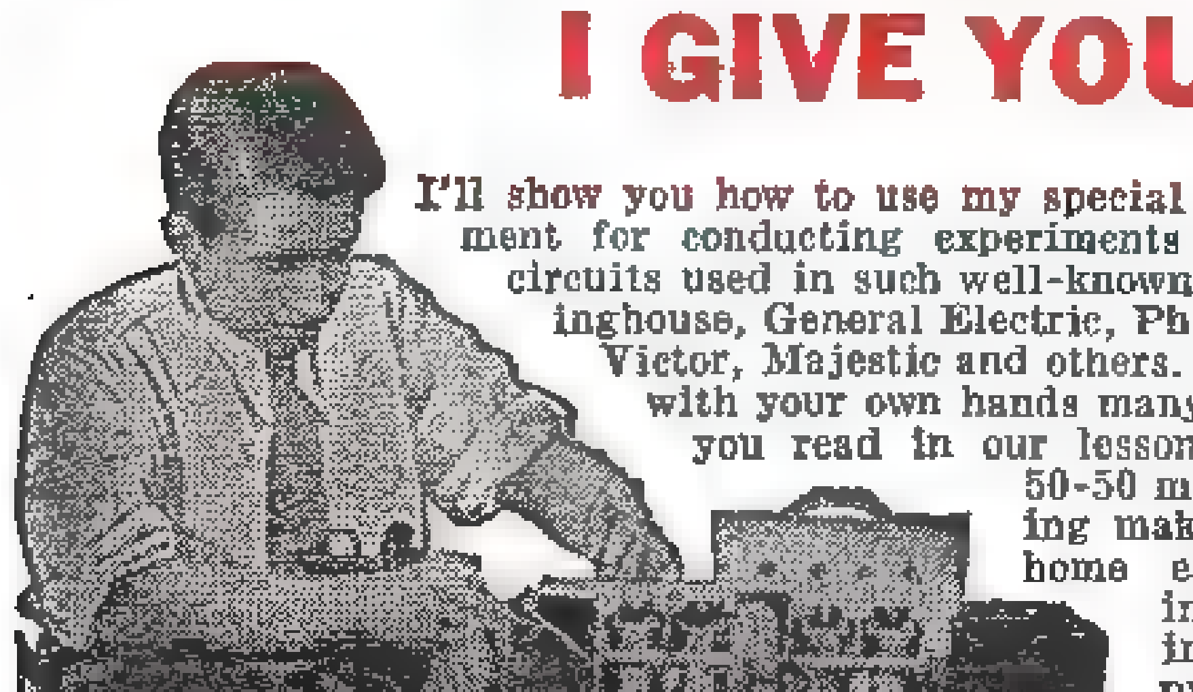
If you are dissatisfied with your present job—if you are struggling along in a rut with little or no prospect of anything better than a skinny pay envelope—Clip and Mail the Coupon NOW! Get my big 64-page FREE BOOK on the opportunities in Radio. Read how quickly you can learn at home in your spare time to be a Radio Expert—what good jobs my graduates have been getting—real jobs with real futures.

Real Opportunities Ahead in Radio for Trained Men

It's hard to find a field with more opportunities awaiting the trained man. Why in 1933—one of the worst depression years—the Radio industry sold $213,000,000 worth of sets and parts! Radio set sales INCREASED 45%—tubesales INCREASED 25%! Over 300,000 people worked in the industry! It's a gigantic business, even in the worst business years. And look what's ahead! Millions of sets are going out of date annually. 18,000,000 sets are now in operation on which over $200,000,000 are spent EACH YEAR for repairs, servicing, new tubes, etc. Broadcasting stations pay their employees (exclusive of artists) approximately $23,000,000 a year. Advertisers pay 600 great Broadcasting Stations over $75,000,000 a year for Radio time and talent. A few hundred jobs that paid $40, $60, $75 a week 20 years ago have grown to thousands. These figures are so big that they're hard to grasp. Yet they're all TRUE! Here's a new industry that has grown to be a commercial giant! No wonder great business leaders predict a brilliant future for the great and growing Radio industry.

Set Servicing
Spare time set servicing pays many N.R.I. men $5, $10, $15 a week extra. Full time men make as much as $40, $60, $75 a week.

YOU GET PRACTICAL EXPERIENCE With RADIO Equipment I GIVE YOU



I'll show you how to use my special Radio Equipment for conducting experiments and building circuits used in such well-known sets as Westinghouse, General Electric, Philco, R. C. A.-Victor, Majestic and others. You work out with your own hands many of the things you read in our lesson books. This 50-50 method of training makes learning at home easy, interesting, fascinating, intensely practical. You learn how sets work, why they work and how to make them work.

Some of the Many Other Jobs N. R. I. Trains Men For

- Radio Service Business of your own
- Spare time Radio Service work
- Retail Sales of Radio Sets and Equipment
- Service Expert for Retail Stores
- Broadcasting Station Operator
- Aircraft Radio Operator
- Ship Radio Operator
- Loud Speaker Systems, Installation and Service
- Auto-Radio Installation and Service
- Television Station Operator
- Commercial Radio Station Operator
- Short Wave Transmitter Installation and Maintenance
- Designing and Building Testing Equipment
- Service Expert with Radio Factory
- All-around Servicing Expert

Get Into This Field With a Future

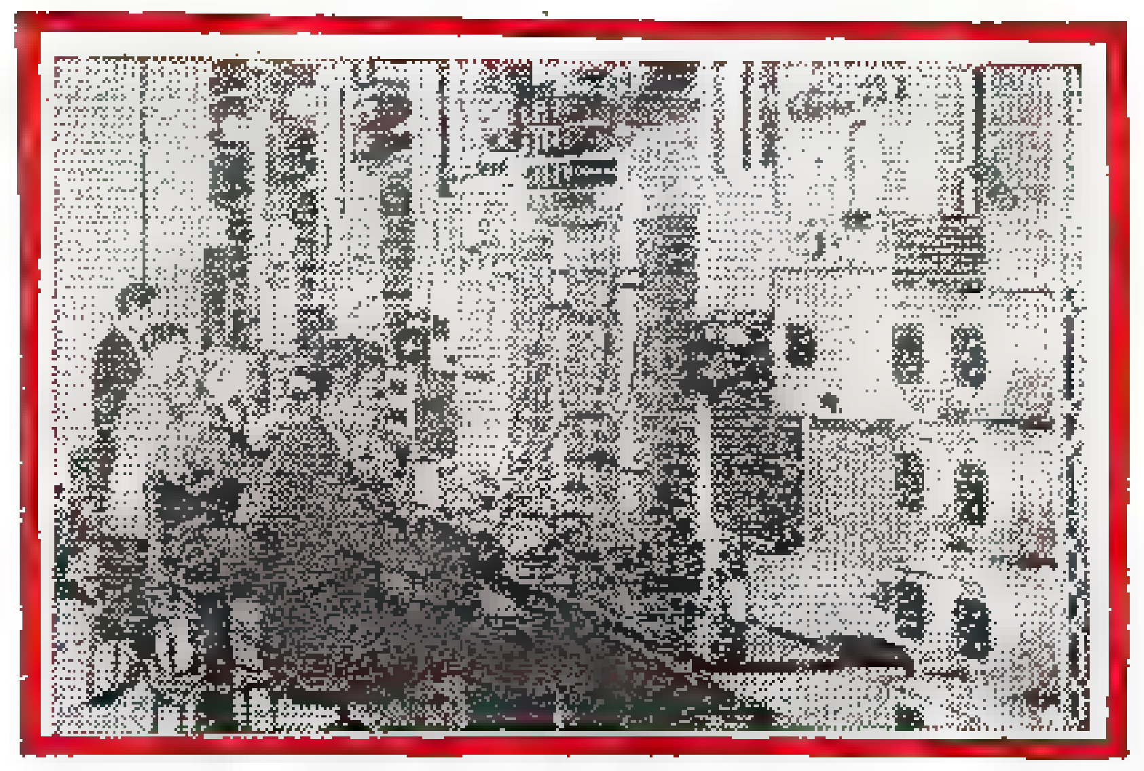
There's opportunity for you in Radio. Its future is certain. Television, short wave, police Radio, automobile Radio, loud speaker systems, aviation Radio, marine Radio—in every branch developments and improvements are taking place. Here is a real future for additional thousands of trained men who really know Radio. Get the Training that opens the road to good pay and success! Send me the Coupon NOW—and get full particulars on how easy and interesting I make learning at home. Read the letters from graduates who are today earning real money in this fascinating industry.

Learn at Home in Your Spare Time To Be a Radio Expert

Hold your job. There is no need for you to leave home. I will train you quickly and inexpensively in your spare time. You don't have to be a high school or college graduate. My Course is written in a clear, interesting style that most anyone can grasp. I give you practical experience under my 50-50 method of Training—one-half from Lesson Books and one-half from practical experience with equipment I give you. This unique and unequalled method has been called one of the greatest developments in home study Radio training.

Many Make $5, $10, $15 a Week Extra in Spare Time While Learning

My big 64-page book gives proof that many make $5, $10, $15 a week extra servicing sets in their spare time soon after enrolling. I give you plans and ideas that have made good spare time money—$200 to $1,000 a year—for hundreds of fellows. My Course is famous as "the one that pays for itself."



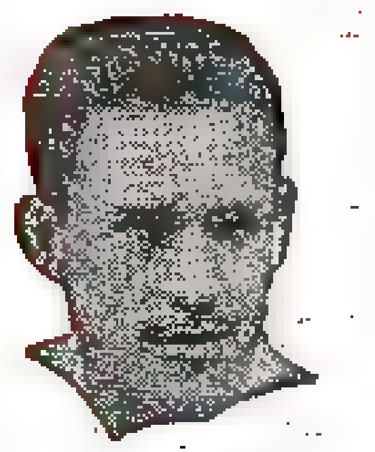
Money Back If Not Satisfied

I am so sure that N. R. I. can train you at home satisfactorily that I will agree in writing to refund every penny of your tuition if you are not satisfied with my Lesson and Instruction Service upon completing your Course. You'll get a copy of this agreement with my Book.

64-Page Book of Information Free

Get your copy TODAY. It's free to any ambitious fellow over 15 years old. It tells you about Radio's spare time and full time job opportunities; it tells you about my Course; what others who have taken it are doing and making. Find out what Radio OFFERS YOU—without the slightest obligation. MAIL THE COUPON in an envelope, or paste it on a penny postcard NOW.

J. E. SMITH, President
NATIONAL RADIO INSTITUTE
Dept. 5AH, Washington, D. C.

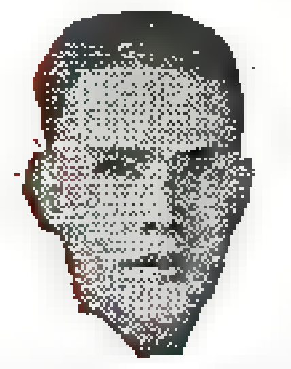


Clears $4,500 In 18 Months

"Before taking your Radio Course I was making $18 a week. I came here three years ago. In about 18 months I made about $4,500 in Radio. I cannot say too much for the wonderful help I have received from N. R. I."—NOEL W. RAY, 619 Broad St., Gadsden, Alabama.

Spare Time Work Pays $18 A Week

"I do only spare time Radio work and average $18 a week. People who in good times would buy a new Radio now have the old one fixed."—STEPHEN J. DRAPCHATY, 407 Wunderlich Avenue, Barberton, Ohio.



Now Owns Own Business

"If I had not taken your Course I would be digging ditches instead of running my own business. One week I made $75 on repairing alone, and this doesn't count sales. If a fellow wants to get into Radio, N. R. I. is the starting point."—R. S. LEWIS, Modern Radio Service, Pittsfield, Ohio.

Get the facts about THE TESTED WAY TO BETTER PAY
Rich Rewards in Radio

Mail Now For FREE 64 Page Book

J. E. SMITH, President
National Radio Institute, Dept. 5AH
Washington, D. C.

Dear Mr. Smith: Without obligating me, send your book which points out the spare time and full time job opportunities in Radio and your 50-50 method of training men at home in spare time to become Radio Experts.

(Please print plainly)

NAME..AGE........

ADDRESS..

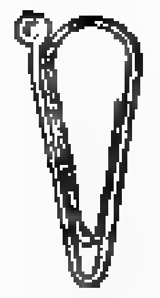
CITY...STATE...............

OTHER MEN Have Read and Profited by this Free Book ABOUT

PATENTS

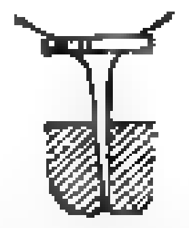
MANY LITTLE IDEAS HAVE BIG COMMERCIAL POSSIBILITIES

The Paper Clip



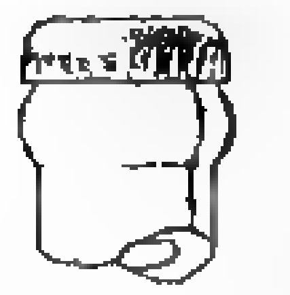
Often some simple, little article will prove to be a big commercial success. Take an ordinary paper clip; just a piece of twisted wire, yet they are sold by the millions every year.

Wooden Golf Tee



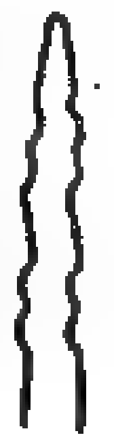
Another little article now used by thousands is the wooden golf tee. For years golfers made their tees with clay or wet sand. Then a man had a hunch to make a tee of wood. The idea was worth a fortune.

Metal Bottle Cap



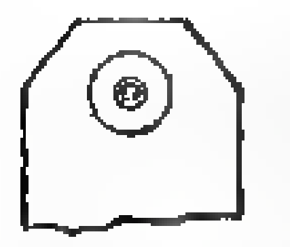
Here's the ordinary metal bottle cap, used on beer and soft drink bottles. Its inventor, William Painter of Baltimore, built a big business and became wealthy with this simple idea.

Hair Pin

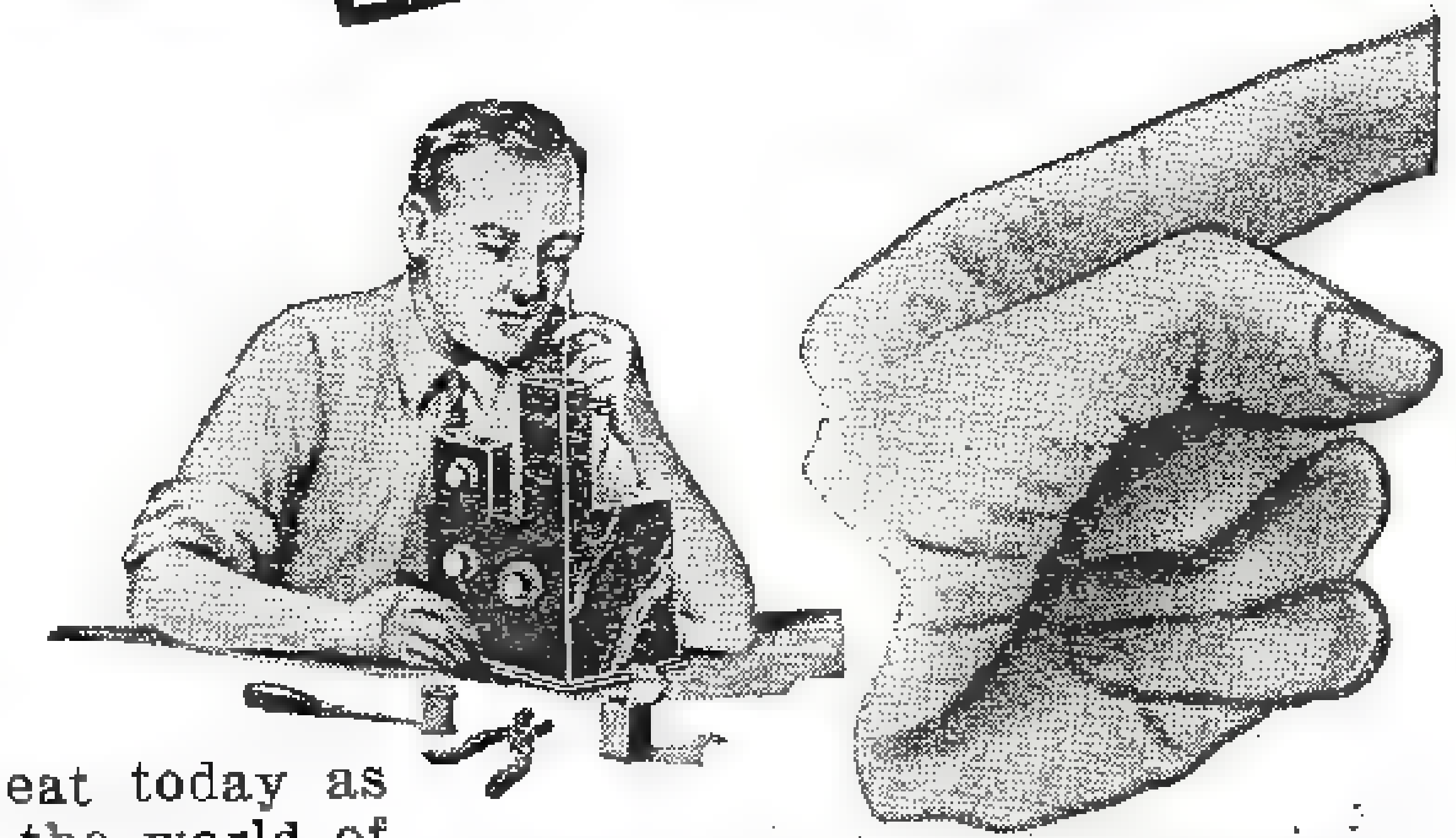


One day a husband noticed his wife bend her hair pins to make them stay put. That gave him the idea for hair pins with kinks. He patented the idea and is said to have reaped tremendous profits.

Shipping Tag



Before Dennison invented a shipping tag with a reinforced eyelet, tags gave much trouble because they pulled off the strings intended to hold them in place. Yet see how simple Dennison's idea was. This is another little article which became the basis for a very large business.



THIS book was prepared for men of ideas—men who have an article in mind that will make money, save money, save labor or give pleasure. Leading thinkers agree that the opportunity for the inventor is as great today as ever before—that the world of a few years from now will be radically different from the world of today because of the contributions to progress that inventors will make. Now is the time—if you have an invention—to see about fully protecting it so that you can be sure of your just share of whatever profits it may make.

C. F. KETTERING

Vice Pres., General Motors Says This About Invention

In statement in Good Housekeeping Magazine, Charles F. Kettering, who helped develop the self-starter, Duco, and other important inventions, said: **"Our return to normal times depends on new manufactured products that will catch the purchaser's eye, get him to buy and start the ball rolling. Change and buying go together. We're only entering the great period of inventive advancement."**

Improvements Can Be Patented

Don't think that to be profitable an idea needs to be complicated. Simple articles—like those shown here at the left—have often proved profitable. Also improvements on patented articles sometimes are more valuable than the original article itself. If you have an invention—at least see what its possibilities may be and HOW YOU CAN PROTECT YOUR OWN RIGHT TO IT.

Don't Delay—Send for this Free Book Now

Many a man has waited until too late to protect an invention by means of a United States Patent. Remember that someone else may be thinking along the same lines that you are; and the Patent Laws place the burden of PROOF on the man who files his Patent Application last. You may have much to gain—and nothing to lose—by acting promptly. Learn the important facts about Patent Protection at once.

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For thirty-six years this organization of Registered Patent Attorneys has served inventors from all over the country—all over the world in fact. **What you write us is held in strict confidence.** We have a large staff of patent specialists to give you expert and prompt service. Yet because of a highly efficient organization, our fees are low; and we also help you with deferred payments. The coupon makes it convenient for you to communicate with us at once. Use it today.

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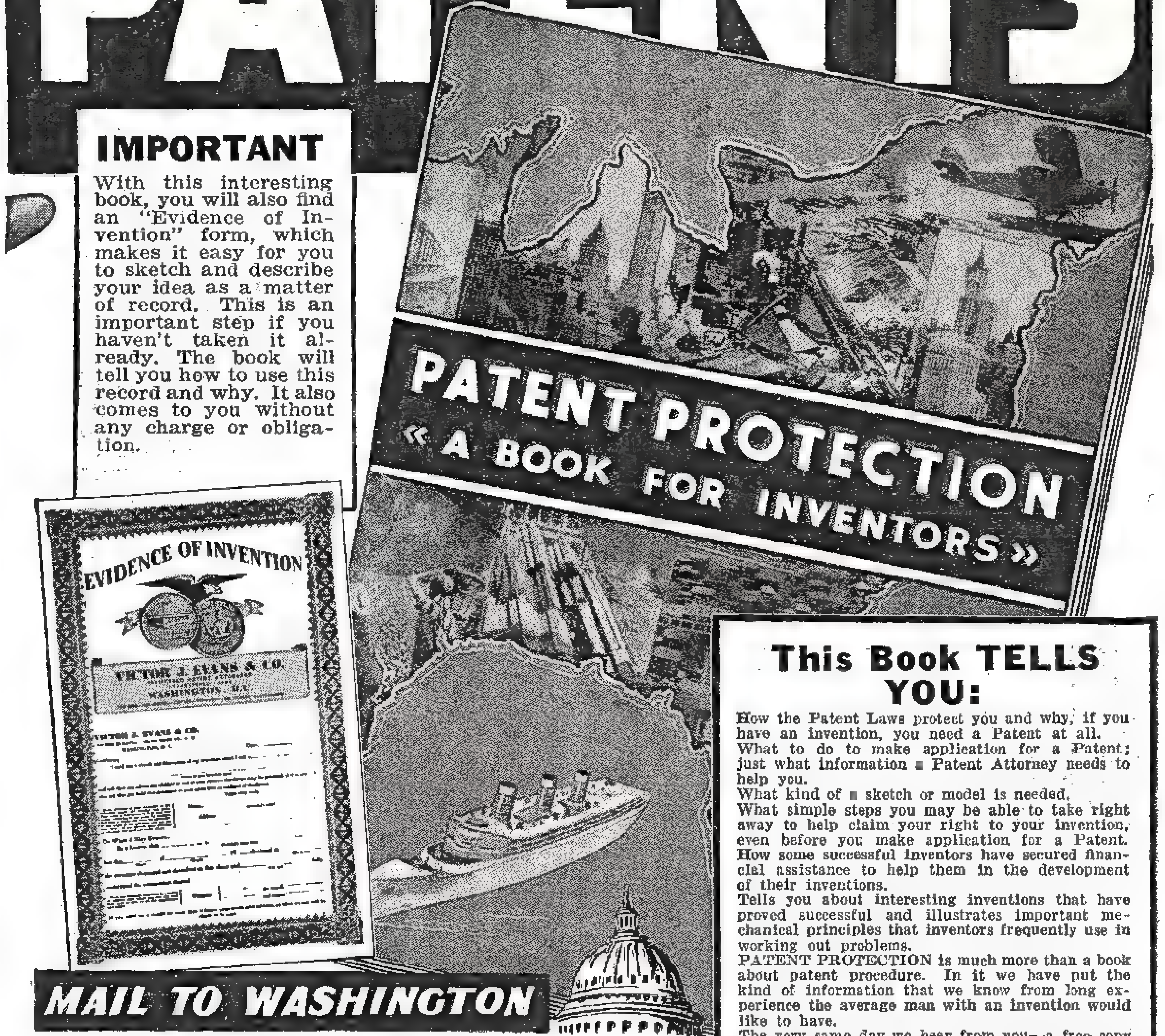

IMPORTANT

With this interesting book, you will also find an "Evidence of Invention" form, which makes it easy for you to sketch and describe your idea as a matter of record. This is an important step if you haven't taken it already. The book will tell you how to use this record and why. It also comes to you without any charge or obligation.

This Book TELLS YOU:

How the Patent Laws protect you and why, if you have an invention, you need a Patent at all.

What to do to make application for a Patent; just what information a Patent Attorney needs to help you.

What kind of a sketch or model is needed.

What simple steps you may be able to take right away to help claim your right to your invention, even before you make application for a Patent.

How some successful inventors have secured financial assistance to help them in the development of their inventions.

Tells you about interesting inventions that have proved successful and illustrates important mechanical principles that inventors frequently use in working out problems.

PATENT PROTECTION is much more than a book about patent procedure. In it we have put the kind of information that we know from long experience the average man with an invention would like to have.

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City or Town .... State ....

(Be Sure to Write or Print Name Carefully)

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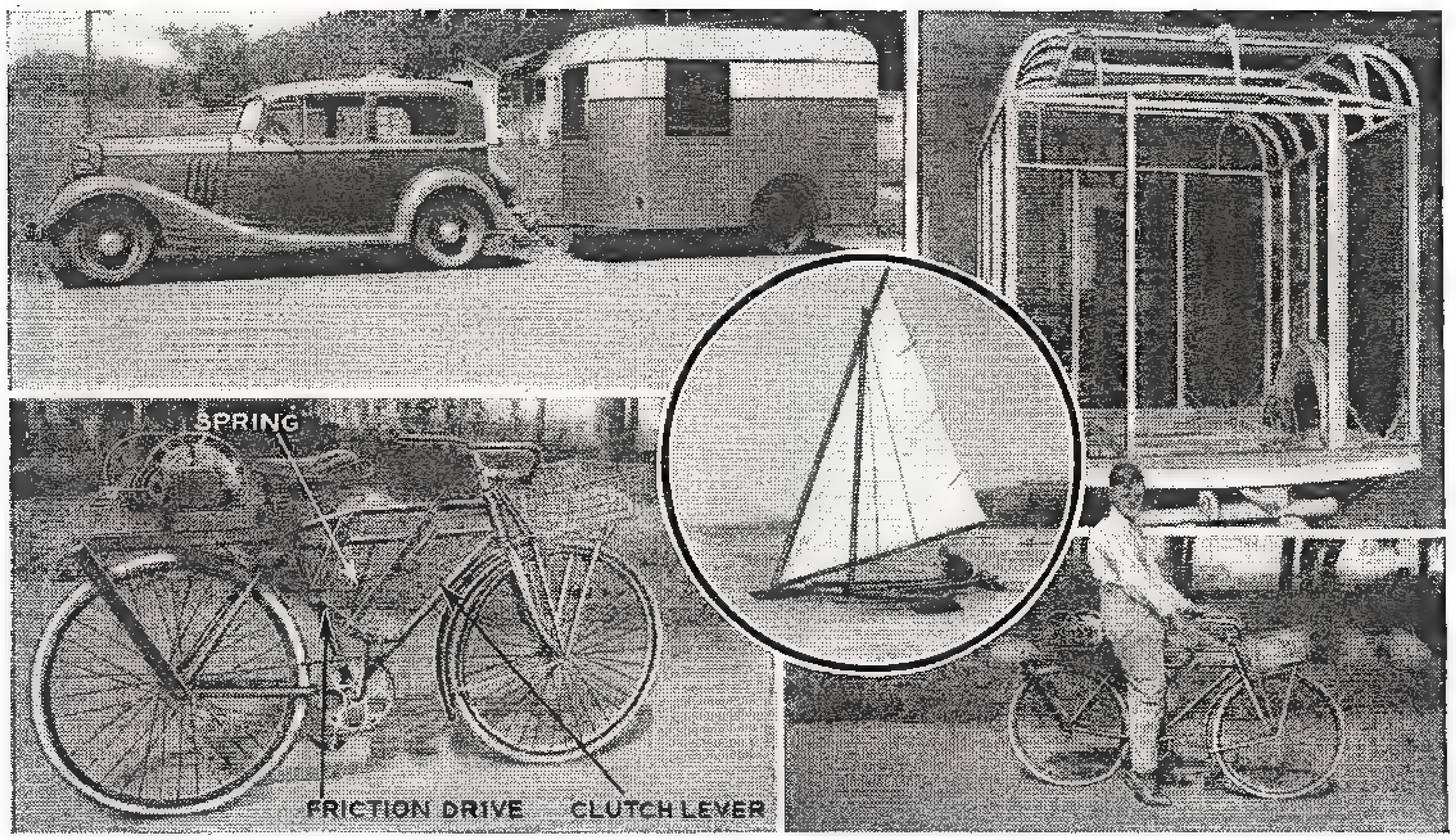
Random Chips from the Editor's Workbench

Want to go prospecting for gold in Canadian wilds? An MM reader is seeking a partner with a seaplane. And here's another contest in $500 cash prize series.



PRIZE WINNERS Mark Chapman built the trailer in two upper photos from MM's Wanderer plans and won first prize of $5.00 this month. Photo of ice boat in circle brought second prize, $3.00, to Ed Shealy. Carl Rasmuson made the motorized bike with a washing machine motor and won third prize, $2.00.

WHEN you have a spare dollar or so, do you go down to the second hand shop, select an old piece of furniture, and then take it home to rebuild it into something so unusual that every visitor praises it?

Or do you get some lumber, seclude yourself for hours or days in your workshop and come out finally with neatly finished furniture of your own design?

If you enjoy doing these things, you will find a big contest offering 14 prizes totaling $125 in cash just suited for you in this issue. Turn to page 44.

The contest is the second in a series of four offering $500 in cash prizes to MM readers. If you missed the first contest in the December, 1934, issue send 15 cents for a copy to Modern Mechanix Publishing Co., 529 S. Seventh St., Minneapolis, Minn.

* * *

A reader turns to MM for help to find someone with a seaplane who would be willing to go into partnership on a venture seeking a fortune in gold in Canadian wilds. Here's his story:

56 St. Clair Ave., W. Apt. 5.
Toronto, Ont.

Dear Editor:

'Tis with despair that I turn to ye! There seems to be no one owning seaplanes around here with gambling spirit or gumption enough to go off on a prospecting venture up to the Long Sac area in northern Ontario, now a booming gold area.

What I am after is a partner with a seaplane. I have had some very valuable experience in the field as well as my studies and laboratory work in mining engineering at school.

It will not be necessary to fly with heavy loads as a base camp may be erected twenty miles from the transcontinental railway and most of the stuff may be sent via rail.

I would like to state that I have the complete outfit necessary for a successful prospecting venture for two. I would also like to say that I have been successful in staking and selling gold claims in the vicinity of Sudbury.

Harry C. Easton.

If you want adventure and have a seaplane, get in touch with Easton. And when you make your gold strike, save a little nugget for a camera and take a photo of your outfit for the Editor's Workbench.

* * *

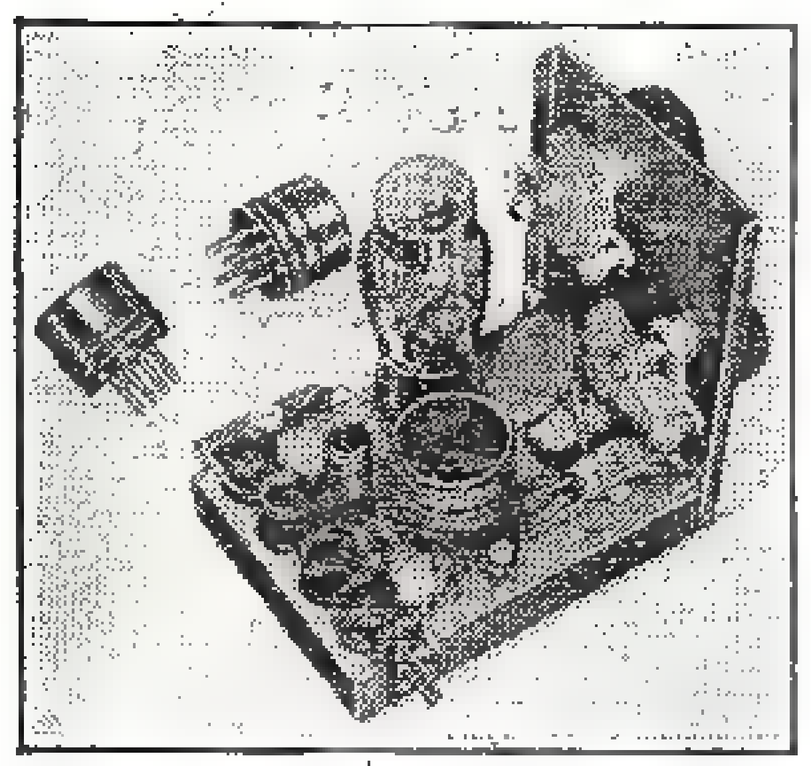
While space permits, we'll give you the winning letters and photos in this month's Workbench contest. First prize of $5.00 goes to M. H. Chapman for the photos of his automobile trailer. His letter says:

Baldwinsville, N. Y.

Dear Editor:

Enclosed are snapshots of the trailer I built and used this summer. I used for my model the "Wanderer" published in the December, 1933, issue of Modern Mechanix and Inventions.

It is built on a Chev. 1929 front axle. It has sides of 1/4" masonite, top of canvas painted aluminum, and is nine feet three inches long, six feet wide and six feet high.



This is the one-tube short wave model described in the October, 1934, MM. G. D. Aydlett, of Norfolk, Virginia, built it.

Not having access to a welding outfit I used oak throughout. The windows are street car windows purchased from an abandoned line. I used the tire of an old lumber wagon wheel for the wheel housing.

The trailer weighs 1460 lbs. with all the equipment. It can sleep four persons and has traveled over the highway better than 50 miles per hour.

M. H. Chapman.

If you want to build as useful a trailer, for 50 cents you can get a copy of the 1935 edition of the Handy Man's Home Manual which includes drawings and all instructions for "Wanderer." Enlarged blueprints can be obtained for $1.00. Send your orders to MM.

* * *

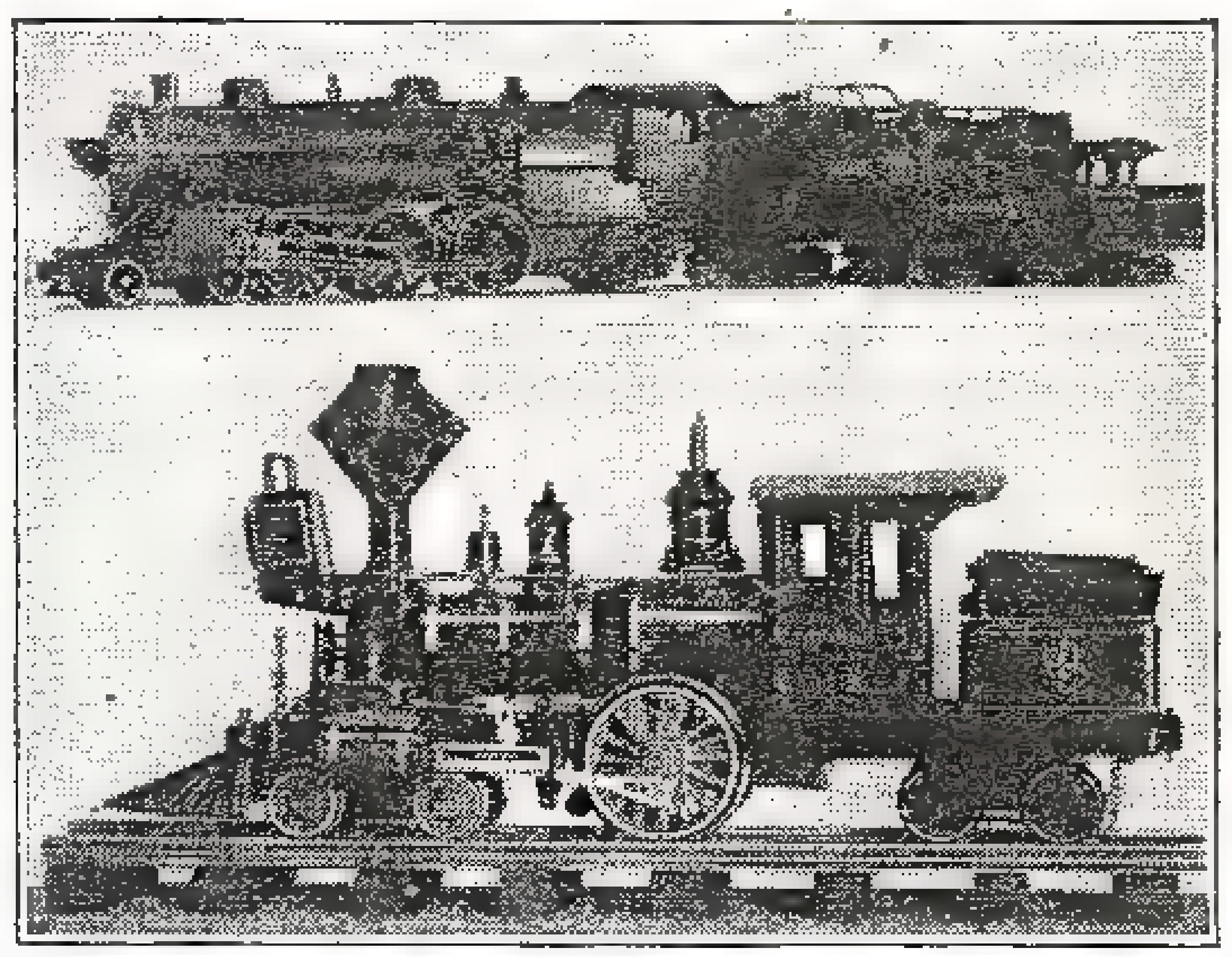
Second prize of $3.00 was awarded to Edward M. Shealy. This is what he says about the ice boat shown in the photo:

Madison, Wis.

Dear Editor:

Enclosed find picture of my ice boat which I built in my spare time in 9 days last winter. It was easy to build and the total cost including the sail was only $14.50. She carries 150 feet of sail and is lateen rigged. The sail is an equilateral triangle 18' on each side and is suspended from a mast by means of a hook. The boat does 50 to 60 m.p.h.

Edward M. Shealy.



Two fine locomotive models built by U. B. Graff. Top photo shows Pacific type and lower first Southern Pacific locomotive. Both are built to scale one-fourth inch to the foot.

* * *

Carl Rasmuson wanted a motorized bicycle and solved the problem easily and at low cost. His photos and letter brought him third prize of $2.00. After assuring us that MM "is the best mag. on the market," he says:

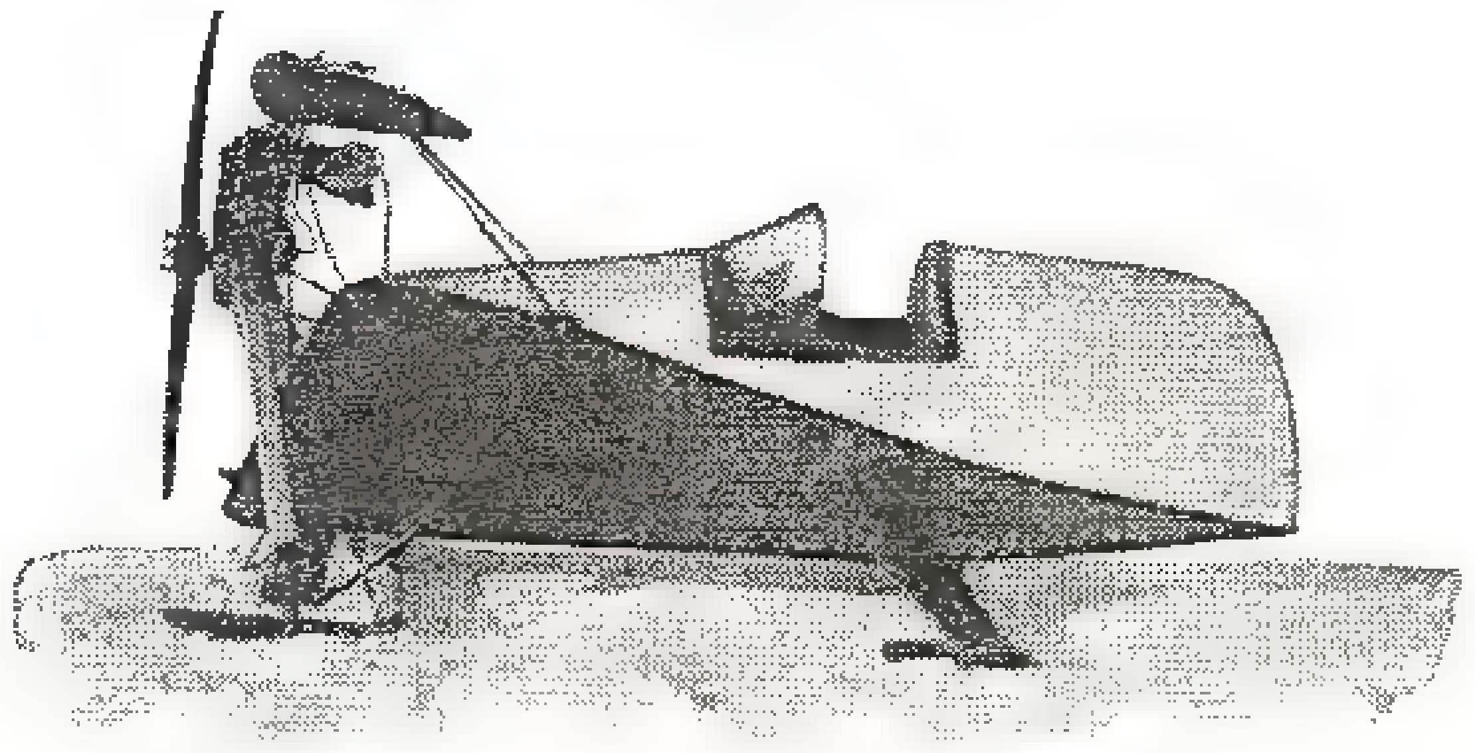
Rockwell City, Ia.

Dear Editor:

I am enclosing two snapshots of a Maytag motor arrangement for a bike. It has friction drive on the rear tire through an old Maxwell fan pulley and a piston for an extended belt pulley. The clutch is held in with a spring. It is started by merely releasing the clutch lever when a little speed is obtained with the pedals. At first the speed was slow but I increased the size of the motor pulley and then got about 18 m.p.h. If anyone is interested I can send details.

Carl Rasmuson.

(Continued on page 20)



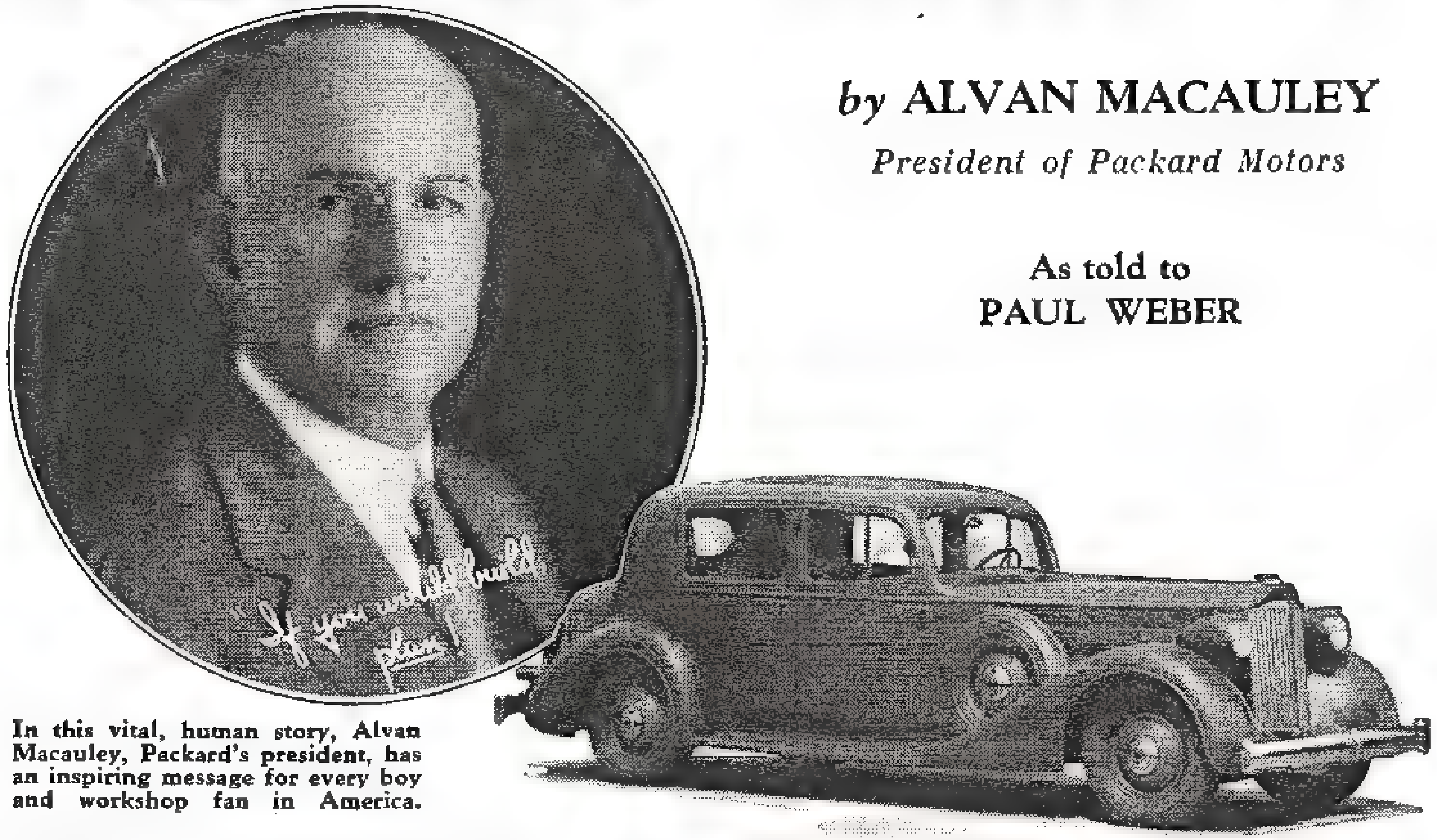
This ice sled, built by John Ceraska, can do 75 m.p.h. on ice. It has a home-made prop and a motorcycle engine.

PACKARD'S PRESIDENT *tells* How Workshop Hobbies *win Success!*

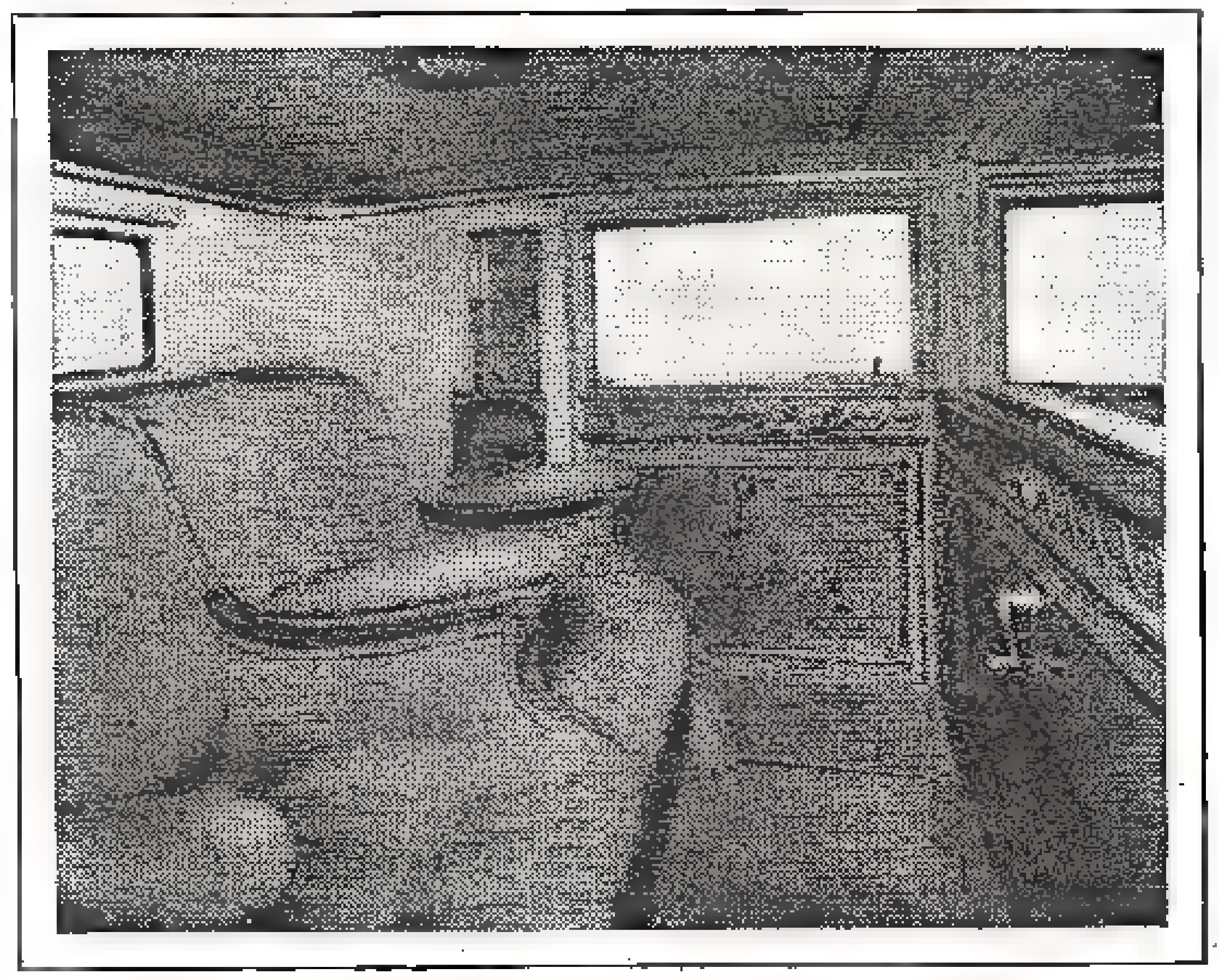
by ALVAN MACAULEY

President of Packard Motors

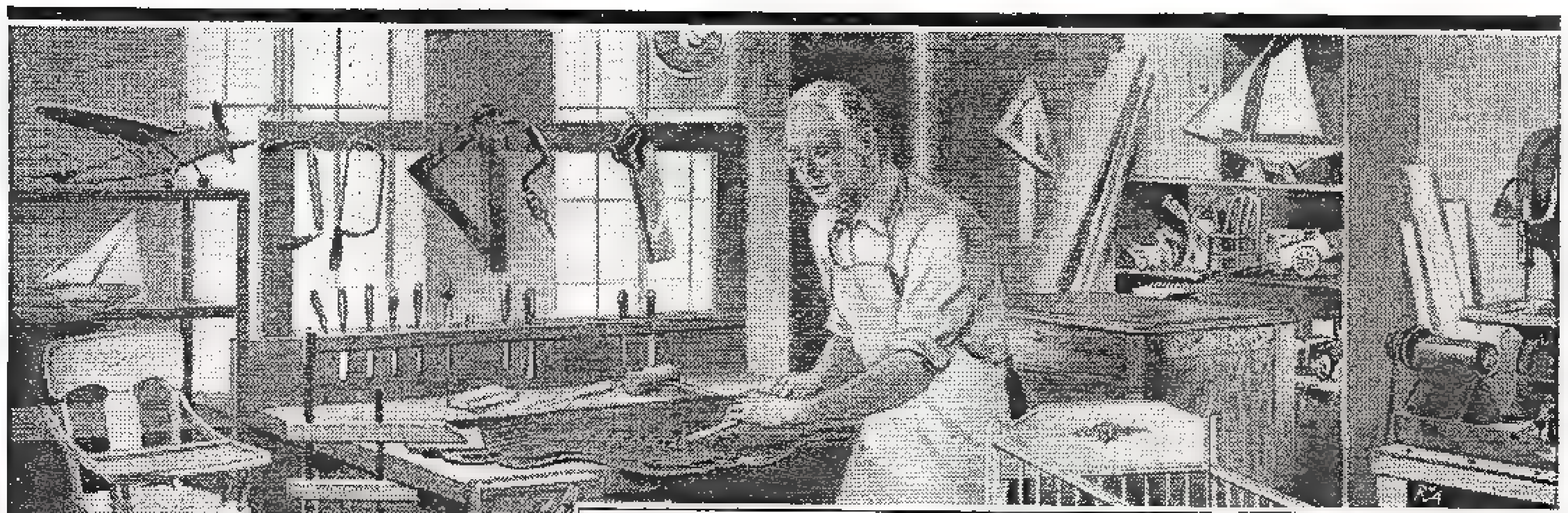
As told to
PAUL WEBER

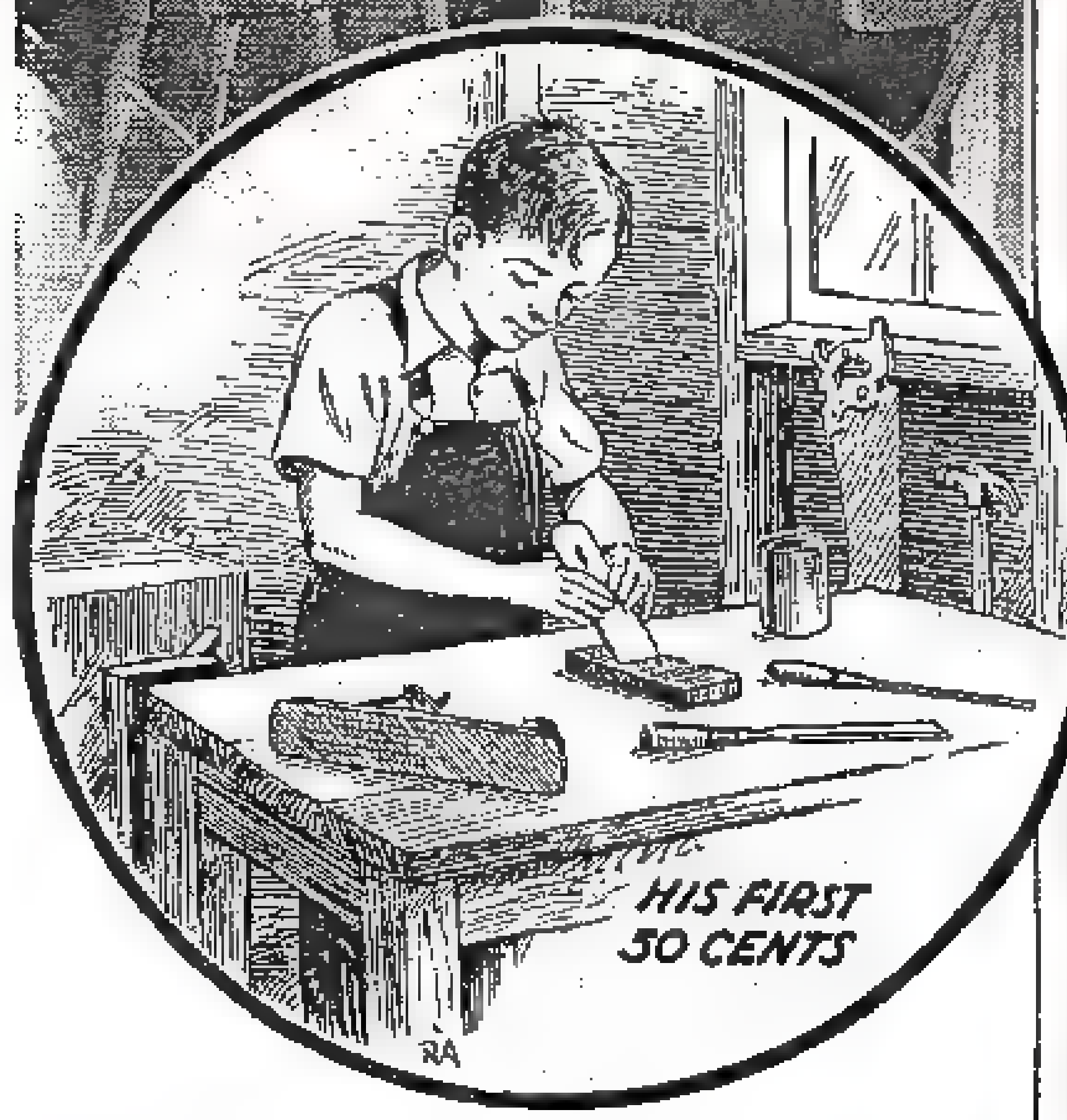


In this vital, human story, Alvan Macauley, Packard's president, has an inspiring message for every boy and workshop fan in America.

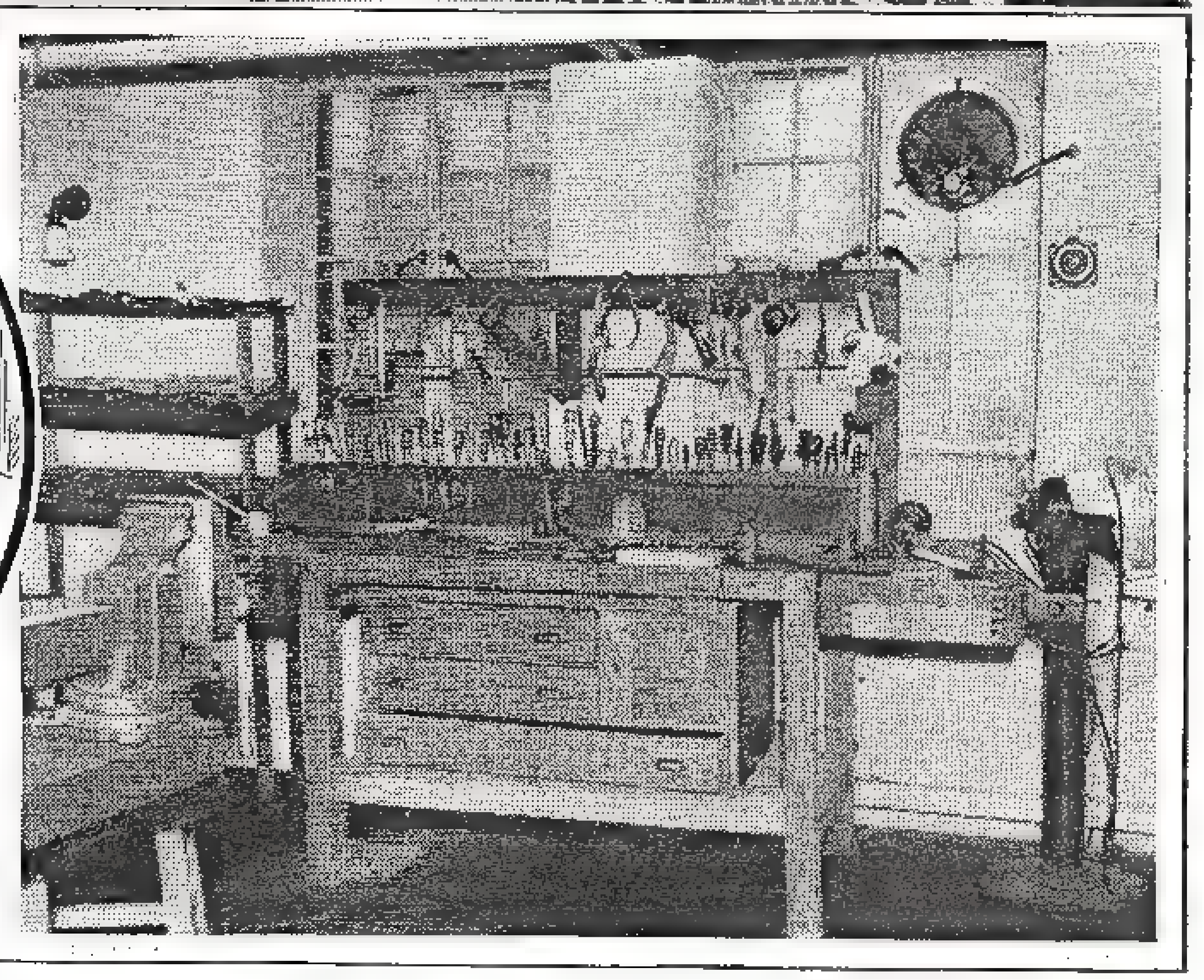


Many of the refinements which grace Packard interiors, such as the carved paneling shown above, were inspired by ideas born from Alvan Macauley's home workshop hobbies.





Mr. Macauley has loved tools all his life. His first half-dollar was spent for an oil-stone to keep chisels, plane-blades sharp.



In the photo and drawing above is shown a section of the home workshop in which Mr. Macauley builds cribs, highchairs and toys for his grandchildren, and beautifully carved pieces of period-design furniture as gifts for friends.

WHEN I was asked to tell readers of MODERN MECHANIX AND INVENTIONS something about the home workshop in which I have spent so many pleasant hours, I at first refused. I could see no particular good in discussing my own personal addiction to a hobby which is so widespread among the men of America, young and old—the hobby of building things with tools.

After some consideration, however, it appeared that I might well change my mind, for two reasons. First, because I believe I have learned one lesson in my workshop which I would like to pass on, particularly to younger readers; and secondly, because (as my young grandsons have often pointed out to me) my workshop is probably just the sort of place every boy dreams about. Possession of it seems to entail some responsibility toward others of the plane-and-chisel fraternity. I suppose anyone who possesses something dear to the desires of millions of boys ought to be willing to talk about it.

Therefore, much as I dislike to talk about myself, I resolved to do so for once on the theory that in this case the end might justify the means.

I have possessed tools of some sort ever since I was old enough to appreciate them. I think I spent the first half-dollar I ever earned for an oil-stone to sharpen my chisels and plane-blades. From the first my liking for tools took a bent toward woodworking, principally because wood is the easiest material for the amateur artisan to work and because it gives excellent results with a minimum of equipment.

My early activities in that line naturally inclined my mind toward the drawing-board, and for some time while studying law at George Washington university I was employed part time in a draughtsman's office in Baltimore. At the same time, because of my youthful love of the saw and chisel, I became interested in the study of woodworking as an art. The subject has held my attention ever since and a considerable section of my library is devoted to works dealing with the history of fine furniture and the technique of the craft.

When I built my present home on the shore of Lake St. Clair in Grosse Pointe, Michigan, I provided plenty of space in the basement to accommodate my work benches and tools. The shop now contains lathes, vises, band-saws, planes, drills, chisels, etc., enough to handle almost any kind of woodworking job I would care to attempt.

During recent years, the pressure of affairs has prevented me from spending a great deal of time at my bench and lathes. But I can look back upon—and forward to, I hope—many happy hours spent in the shop.

One of my greatest pleasures has been to build things for my eight grandchildren, two of whom are boys, just at the tool-loving ages of seven and ten. For the children I have built high-chairs, cribs, small chairs, and numerous toys, including an armada of toy boats.

My other workshop projects have been chiefly pieces of carved furniture which I tried to make true to some period design. These were usually given away to friends —who, of course, *had* to be very much pleased.

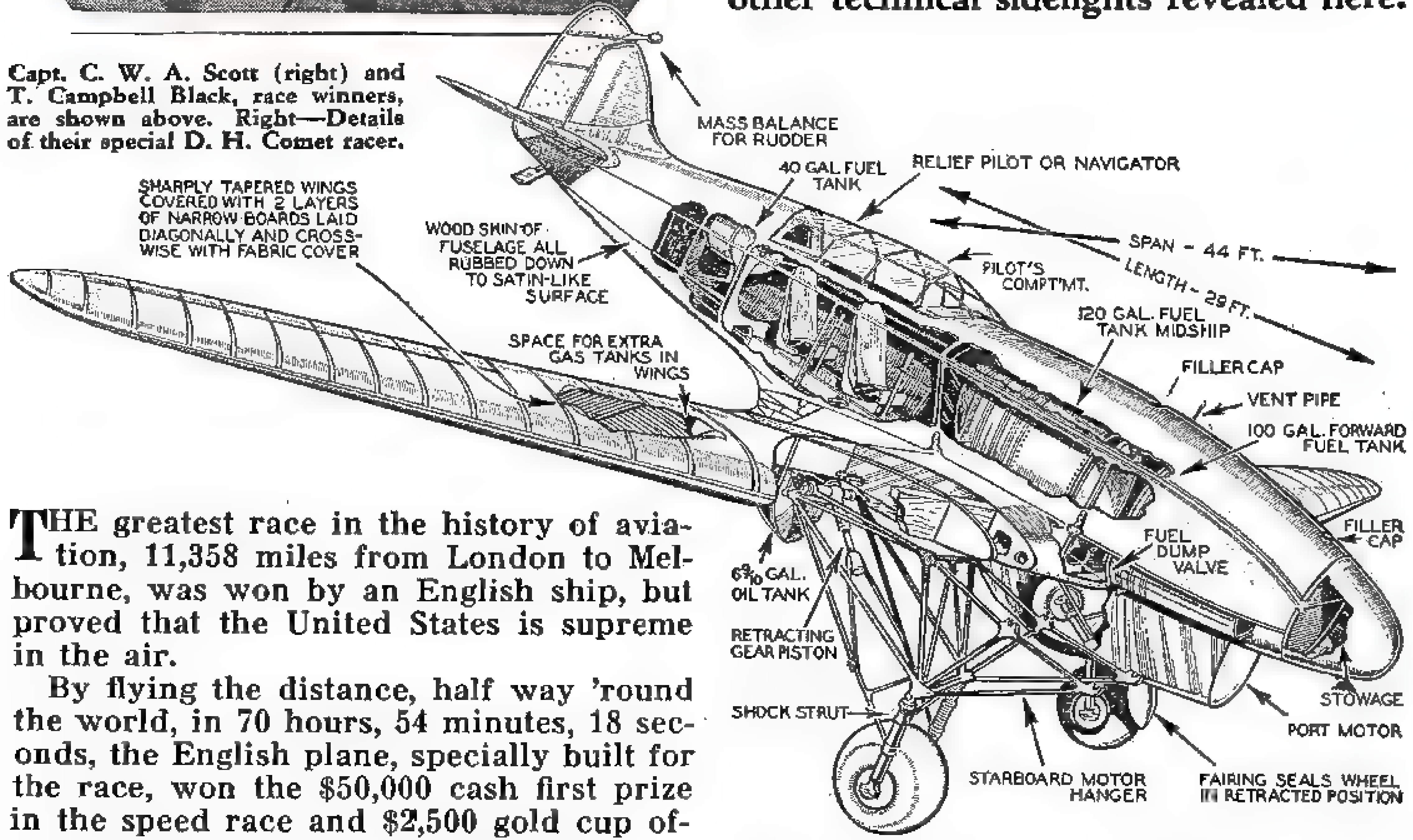
Quite frequently, business and pleasure find a common ground in my workshop. Many of the ideas I have contributed to the interior finishing of Packard automobiles—especially custom body jobs—have had their inception while I was chiseling away at some project in my basement.

Every boy who shows a love of working

How Special Built Plane Won Greatest Air Race

by JAMES DYSON

American transport ships eclipse speed victory of British racer in dash half way 'round the world. Radio movies and other technical sidelights revealed here.


MASS BALANCE FOR RUDDER
40 GAL FUEL TANK
RELIEF PILOT OR NAVIGATOR
SHARPLY TAPERED WINGS COVERED WITH 2 LAYERS OF NARROW BOARDS LAID DIAGONALLY AND CROSS-WISE WITH FABRIC COVER
WOOD SKIN OF FUSELAGE ALL RUBBED DOWN TO SATIN-LIKE SURFACE
SPAN - 44 FT.
LENGTH - 29 FT.
PILOT'S COMPT'MT.
120 GAL. FUEL TANK MIDSHIP
SPACE FOR EXTRA GAS TANKS IN WINGS
FILLER CAP
VENT PIPE
100 GAL. FORWARD FUEL TANK
FILLER CAP
FUEL DUMP VALVE
6 6/10 GAL. OIL TANK
RETRACTING GEAR PISTON
SHOCK STRUT
STOWAGE
PORT MOTOR
STARBOARD MOTOR HANGER
FAIRING SEALS WHEEL IN RETRACTED POSITION

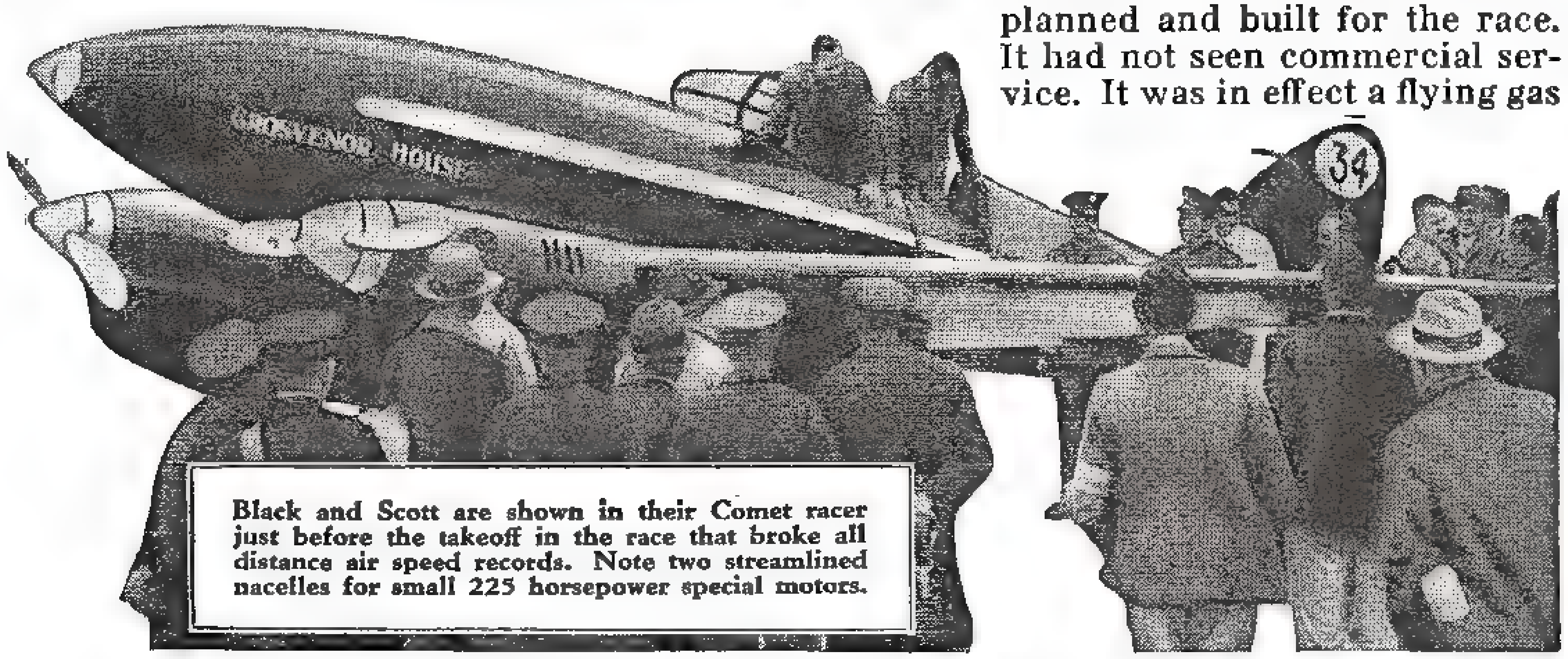
Capt. C. W. A. Scott (right) and T. Campbell Black, race winners, are shown above. Right—Details of their special D. H. Comet racer.

THE greatest race in the history of aviation, 11,358 miles from London to Melbourne, was won by an English ship, but proved that the United States is supreme in the air.

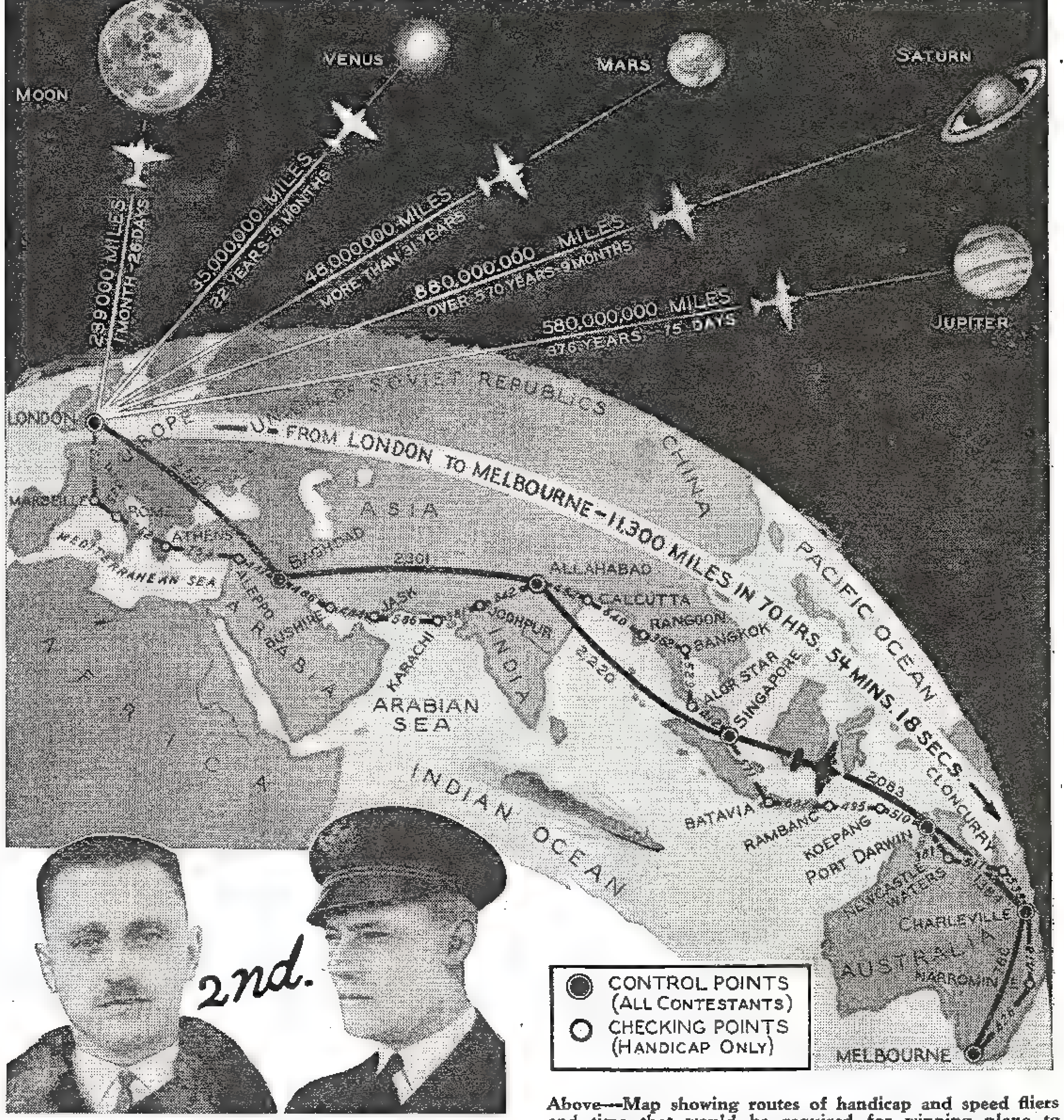
By flying the distance, half way 'round the world, in 70 hours, 54 minutes, 18 seconds, the English plane, specially built for the race, won the $50,000 cash first prize in the speed race and $2,500 gold cup offered by Sir MacPherson Robertson, Australian candy manufacturer. The astounding time, less than three days, cut by more than half the record of 6 days, 17 hours, 56 minutes established in 1933 by Charles J. P. Ulm.

This great speed, averaging 176 miles per hour in flying time, was eclipsed, however, by the feats of two American ships which arrived in second and third positions in Melbourne. Both were standard commercial airliners, similar to those used on the regular transport lines in the United States.

The British ship, on the other hand, was planned and built for the race. It had not seen commercial service. It was in effect a flying gas tank intended for racing. Eventually it probably will be put into commercial service, but before that can be accomplished it will have to be modified to provide room for passengers and cargo.


GROSVENOR HOUSE
34

Black and Scott are shown in their Comet racer just before the takeoff in the race that broke all distance air speed records. Note two streamlined nacelles for small 225 horsepower special motors.


MOON
VENUS
MARS
SATURN
JUPITER
239,000 MILES 1 MONTH-26 DAYS
35,000,000 MILES 22 YEARS-6 MONTHS
48,000,000 MILES MORE THAN 31 YEARS
880,000,000 MILES OVER 570 YEARS-9 MONTHS
580,000,000 MILES 376 YEARS 75 DAYS
LONDON
EUROPE
UNION OF SOVIET REPUBLICS
FROM LONDON TO MELBOURNE—11,300 MILES IN 70 HRS. 54 MINS. 18 SECS.
CHINA
PACIFIC OCEAN
ASIA
MARSEILLE
ROME
ATHENS
MEDITERRANEAN SEA
ALEPPO
BAGHDAD
2301
ALLAHABAD
CALCUTTA
RANGOON
BANGKOK
BUSHIRE
JASK
KARACHI
JODHPUR
ARABIA
INDIA
AFRICA
ARABIAN SEA
2220
ALOR STAR
SINGAPORE
INDIAN OCEAN
2083
CLONCURRY
BATAVIA
RAMBANG
KOEPANG
PORT DARWIN
NEWCASTLE WATERS
CHARLEVILLE
AUSTRALIA
NARROMINE
MELBOURNE
2nd.

●	CONTROL POINTS (ALL CONTESTANTS)
○	CHECKING POINTS (HANDICAP ONLY)

Above—Map showing routes of handicap and speed fliers and time that would be required for winning plane to reach planets and the moon. Left—J. J. Moll (left) and K. D. Parmentier, Dutch fliers, who turned in the outstanding performance of the race with a stock Douglas.

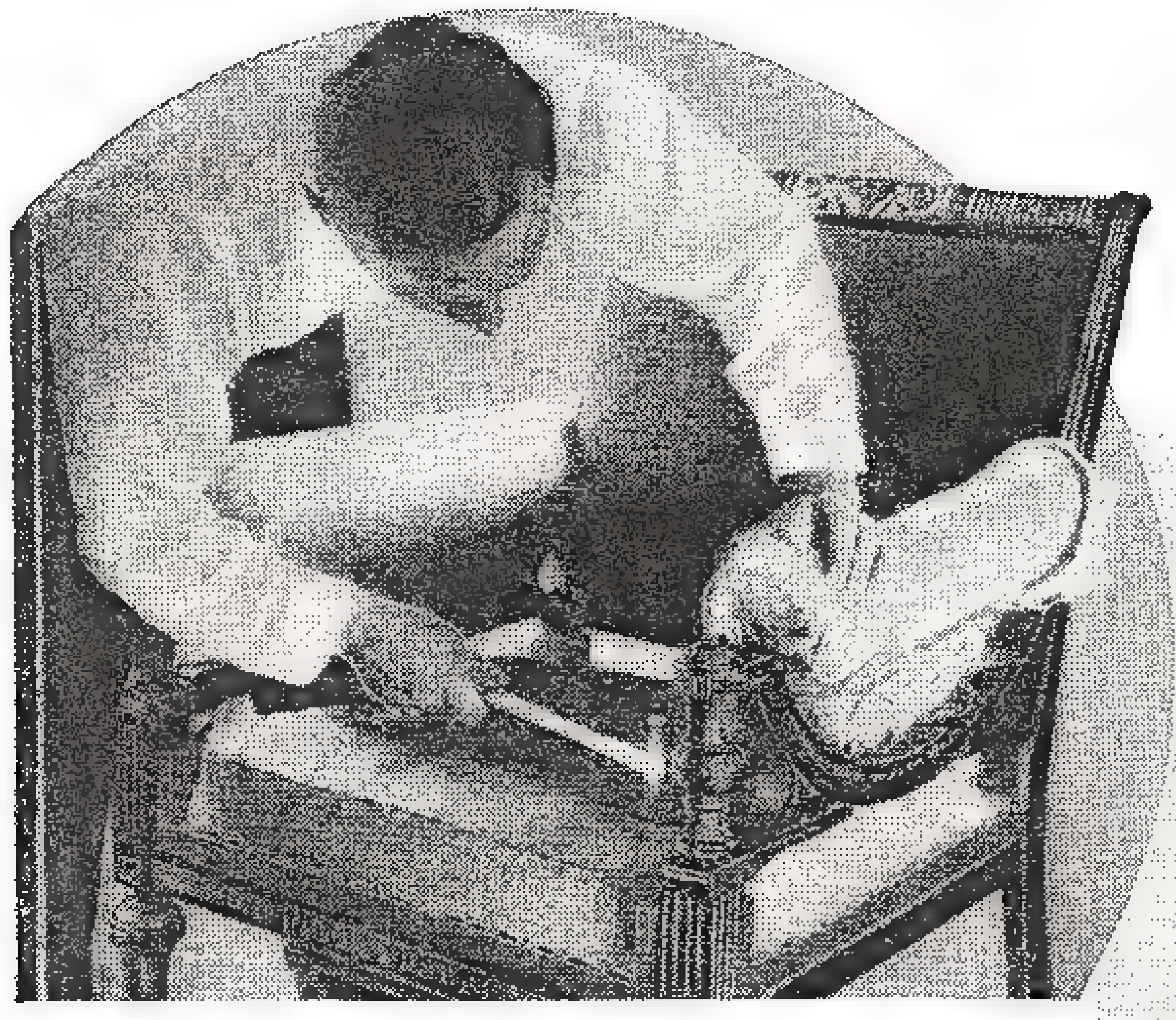
Of the two American ships in the prize money the outstanding performance was accomplished by a standard Douglas DC 2 airliner flown by the Dutch team of K. D. Parmentier and J. J. Moll. It was the second ship to reach Melbourne, its handicap time being 3 days, 4 hours, 38 min. It outshone the winning D. H. Comet, by flying approximately 1,000 more miles by stopping at every checking point on the route and by carrying six persons, to the British plane's two, a cargo of mail, baggage, and food for passengers and crew.

The second American ship to press the British racer was a Boeing 247D transport plane flown by the noted fliers, Capt. Roscoe Turner and Clyde Pangborn. They landed in Melbourne just three hours after the Dutch team. Their total time from London to the Australian city was 3 days, 20 hours, 55 minutes.

The greatest scientific sidelight of the race was the transmission by radio of news-

Win CASH for Furniture IDEAS in $500.00 Contest

Here's your chance to win one of 56 prizes, totaling $500.00 in cash. This is the second of four big contests for home improvements for MM readers.



At right is a battered old fashioned chair that was converted into the modern occasional chair shown in circle on next page. Photo above shows upholstering being tacked in place on arm of chair. Seat is ready for cotton batting.

Do you enjoy rebuilding second hand furniture or do you prefer to work out your own designs for tables, chairs, floor lamps and other articles for the home? In either case you have a chance to win one of 14 prizes totaling $125.00 in this contest, the second of four offering $500.00 in cash.

This month the prizes are offered for the best ideas from readers on rebuilding or designing furniture. Many of you have converted old radio cabinets into beautiful chests, second hand rocking chairs into porch swings, and old-fashioned furniture into more modern pieces. Others have designed furniture along modernistic, colonial, mission or other period lines.

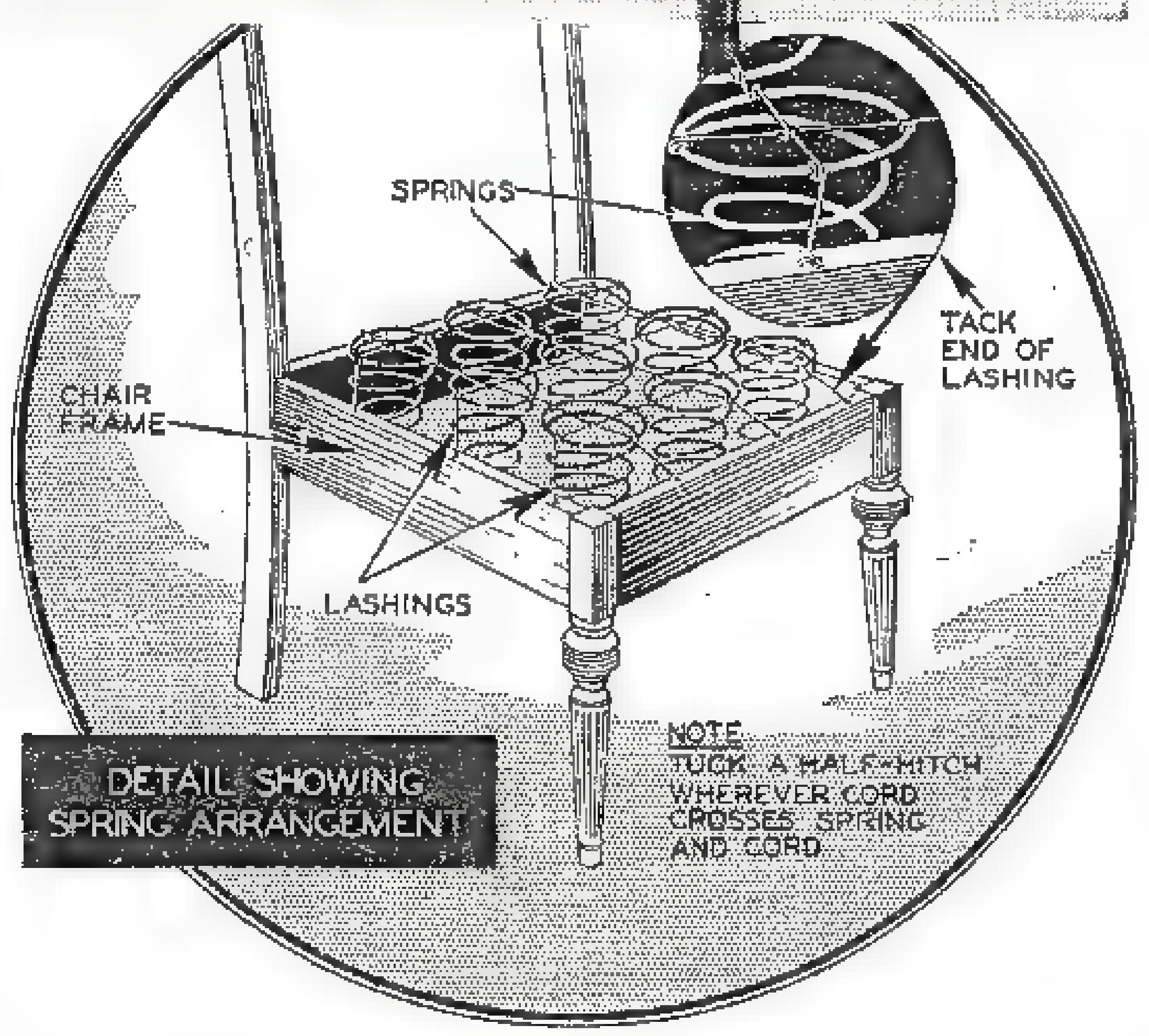
To enter this contest all you have to do is tell as briefly as possible how to build or rebuild any article of furniture for the home. Read the rules and list of prizes on the next page and then send in your entry. The following article will show you one way to prepare your entry.

by J. JULIUS FANTA

RE-UPHOLSTERING a set of old furniture has various distinct advantages one should not pass up when making household changes this winter. If you are tired of your present set, you can acquire at low cost a suite of castaway chairs. Under the dust-covered, shredded pieces of grandmother's day are just the "makings" of a set now in vogue.

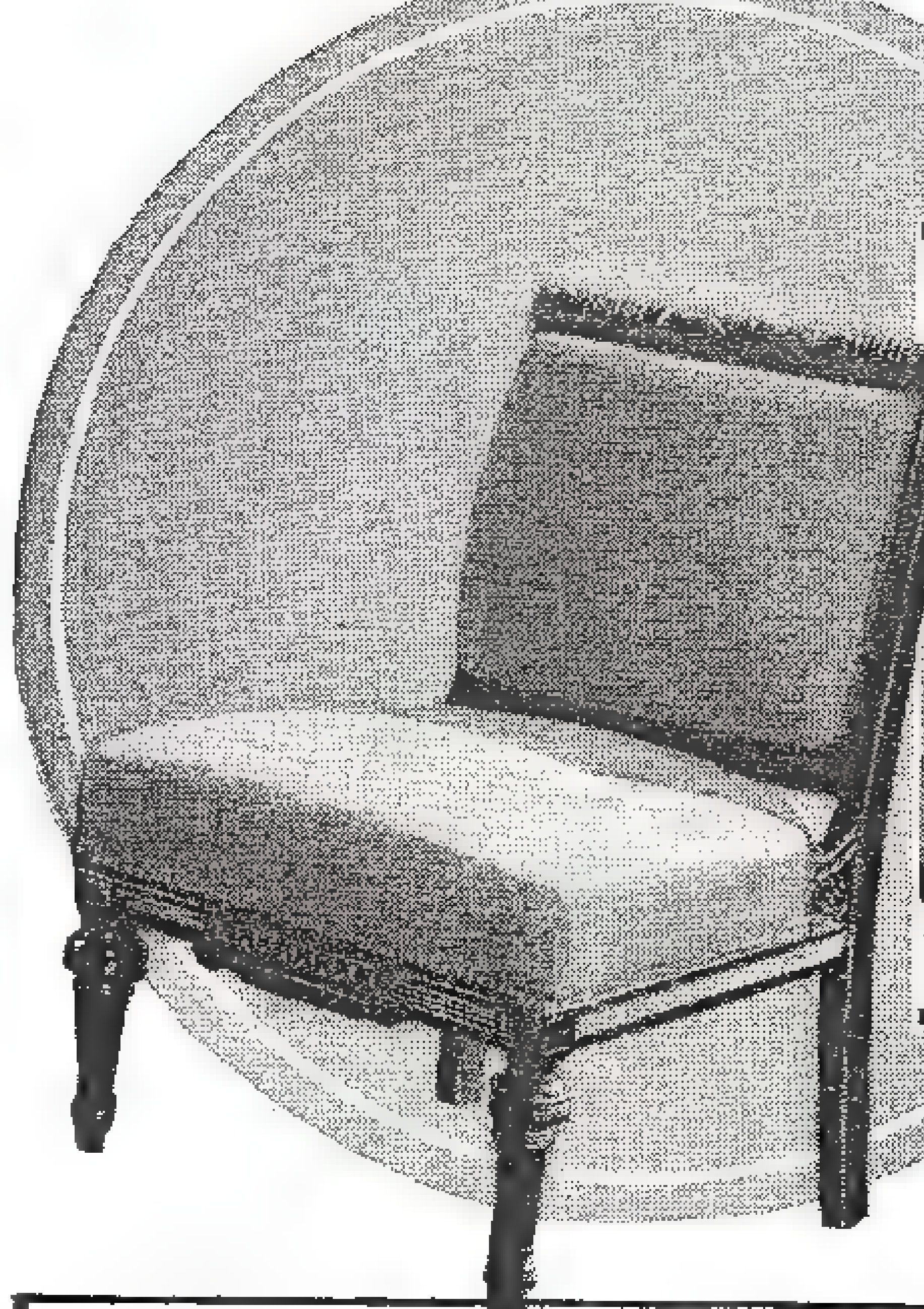
Should your present set be on its last legs, look for one that's still solid in structure, with sound joints. The condition of the upholstering does not matter since we must re-upholster to bring the chairs up to date.

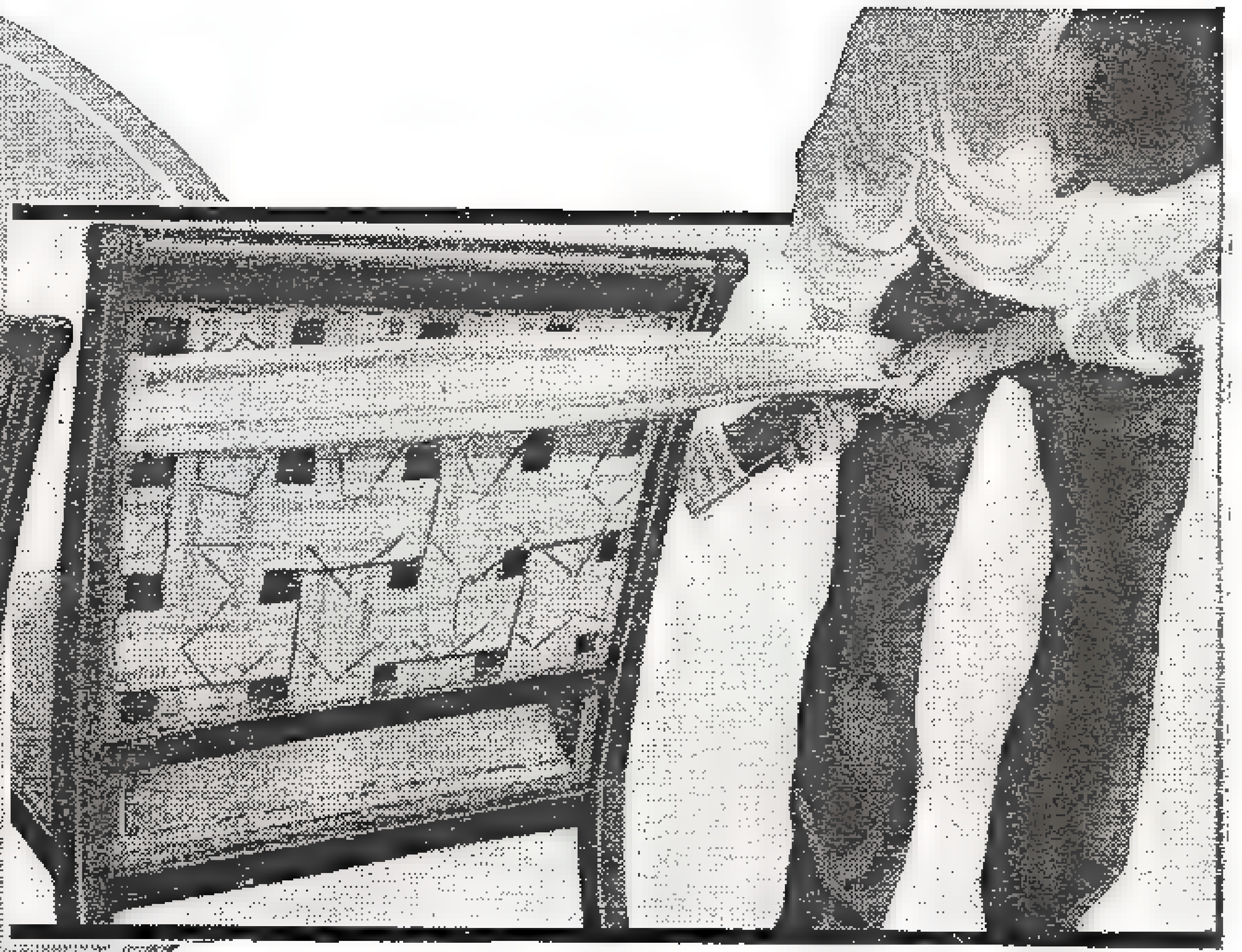
In buying material figure about 2½ yards of 54" tapestry for two small chairs. For a two-person settee you'll need three yards of the same material. Three yards of 4" webbing are required to support the springs of a small chair. Larger pieces should be measured for the exact amount,



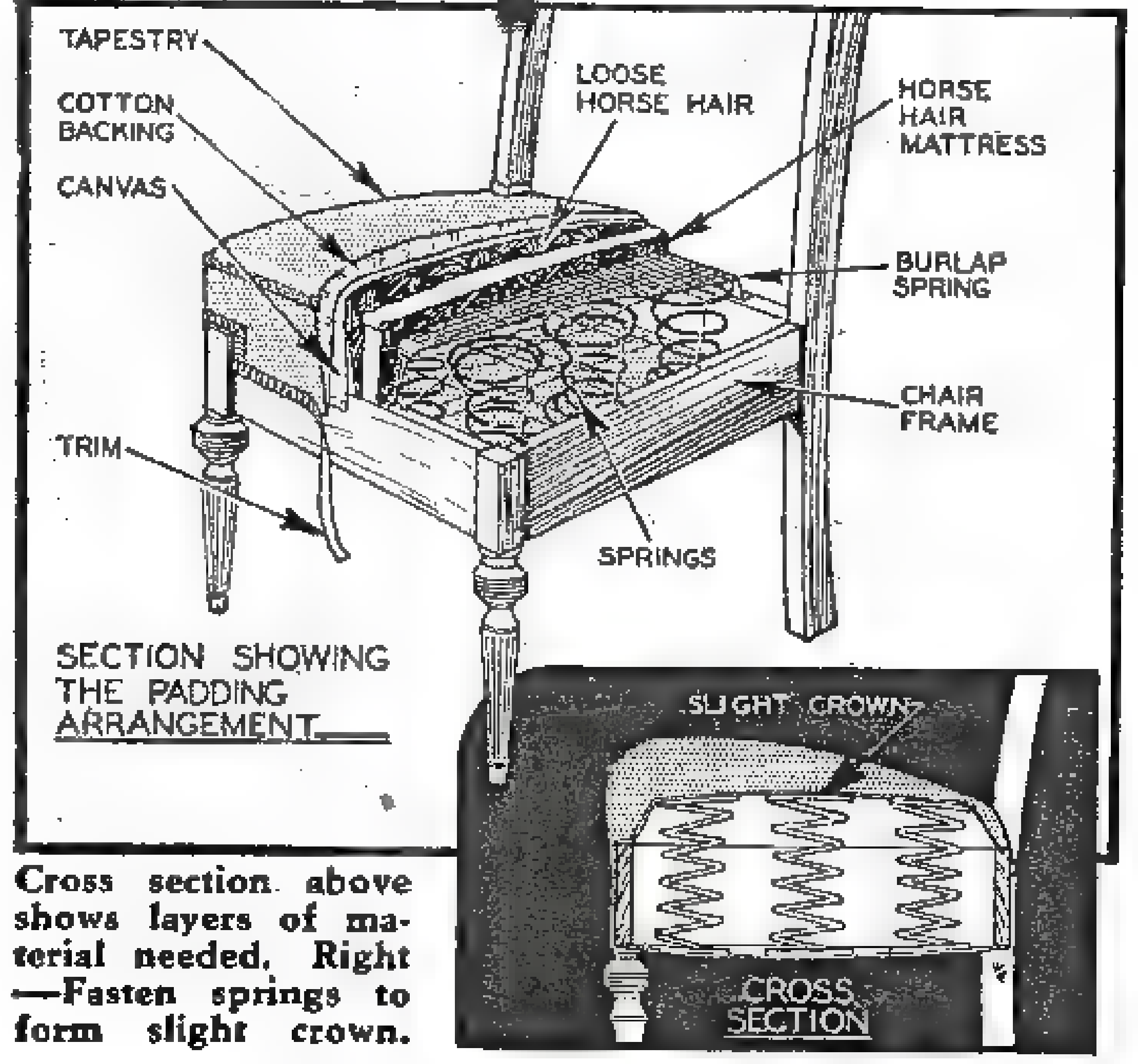
SPRINGS
TACK END OF LASHING
CHAIR FRAME
LASHINGS
DETAIL SHOWING SPRING ARRANGEMENT
NOTE
TUCK A HALF-HITCH WHEREVER CORD CROSSES SPRING AND CORD

All old upholstering is removed. The tops of the springs are spaced evenly and held in place with cord as shown.





Pull webbing taut with 8 in. board padded at one end and sharpened nails at other. Put padded end against chair, catch webbing on nails, with leverage action draw taut.



Cross section above shows layers of material needed. Right—Fasten springs to form slight crown.

allowing 1½" between each strip. To freshen up the old job, light canvas, cotton batting and burlap should be included on the shopping list.

A half-dollar will cover the cost of a magnetized hammer, a 3" curved upholstery needle, tacks and upholstery twine. Much time can be saved by using a magnetized hammer to set the tacks in close quarters.

Begin by removing the tumble-down upholstery with a screw-driver. Clear the chair right down to the "bone." Make sure that you have lifted out all the old tacks embedded in the tack panel. The old tapestry, padding, etc., should not be immediately destroyed but preserved to insure accuracy in measuring all new parts. There will be future use for most of them.

The webbing which serves as the foundation for the springs is basket-woven across

(Continued on page 129)

RULES FOR SECOND CONTEST

Suggestions for building or rebuilding any article of furniture used in the home can be entered in this contest.

Readers can submit as many entries as they wish. Entries may be submitted in all four contests and prizes won in all four.

Furniture ideas must not call for professional services. All work must be within the scope of the average home workshop man.

Each entry must include a written description of 1,000 words or less, giving detailed instructions on building or rebuilding one article of furniture. Rough sketches to illustrate the design or work involved should be included. Photographs are not required. Do not submit actual articles of furniture.

Fourteen prizes will be awarded for the best and most practical ideas as follows: first prize $60.00; second prize $20.00; third prize $8.00; five fourth prizes at $5.00 each; six fifth prizes at $2.00 each; total $125.00.

Modern Mechanix and Inventions reserves the right to publish any entry winning a prize without further compensation to contestant.

Each contestant agrees to permit Modern Mechanix and Inventions to publish all or part of any entry not winning a prize. Entries so used will be paid for at regular rates for the amount of material published.

No entries will be returned.

Address entries to Furniture Contest, Modern Mechanix and Inventions, 529 S. Seventh St., Minneapolis, Minn. All entries must reach this office before midnight, January 22, 1935. Winners will be announced in the April, 1935, issue of Modern Mechanix and Inventions. The third contest in this series will be announced in the February issue. The first contest was announced in the January issue.

SEE FEBRUARY M-M FOR THIRD CONTEST

SEEKING WEALTH in Virginia's New Gold Rush

by JAMES NEVIN MILLER

ONLY a few miles from Rapidan Camp, Virginia, where President Hoover once maintained his summer White House, a vein of gold is being worked that promises to develop into one of the richest ever discovered in the East or South.

The nation's newest gold diggings center in the Melville and Vaucluse mines near Wilderness, about 20 miles southwest of Fredericksburg—the heart of the historic region where some 30,000 Confederate and Federal troops perished in the bloody battle of the Wilderness.

Although activities in the district are new, the mines themselves are not recent discoveries. Worked in the days prior to the California gold rush, the mines were later abandoned as the nation's gold seekers turned to more heavily paying fields. Then the government stepped in recently and set a new value on the precious metal—officially pegged the price of gold at $35 an ounce—and the wheels of the mining industry again began to hum in the Virginia hills.

Today the workers in the Wilderness mines have sunk shafts 220 feet below the surface and are mining quantities of ore which assays around $5 to the ton. And even more important is the fact that discovery of pay dirt in the abandoned Virginia diggings may create a new American gold field. Federal mining specialists have been fired with enthusiasm over returns from the Wilderness mines. As a result, they are planning a thorough probe of the Appalachians, once regarded as the righest gold region in the United States, for other new or abandoned mines.

Most of the 75 men working the Wilderness mines today are rank novices, farmer boys in fact. But thus far they have shown themselves to be adept pupils in learning the necessary semi-technical facts about blasts, ore faces, mucking and drifts.

Supervising their work is an extremely able mining engineer, C. Hyde Lewis, who's also vice-president of the Rapidan Gold Corporation which owns and operates the mines.

While the RGC is the only company actually mining in the immediate region, quite a number of other companies are buying up much of the nearby land for the purpose of sinking exploration shafts. Among these is a prominent Pittsburgh outfit, while a handful of wealthy Canadian engineers are continually browsing about.

(Continued on page 119)

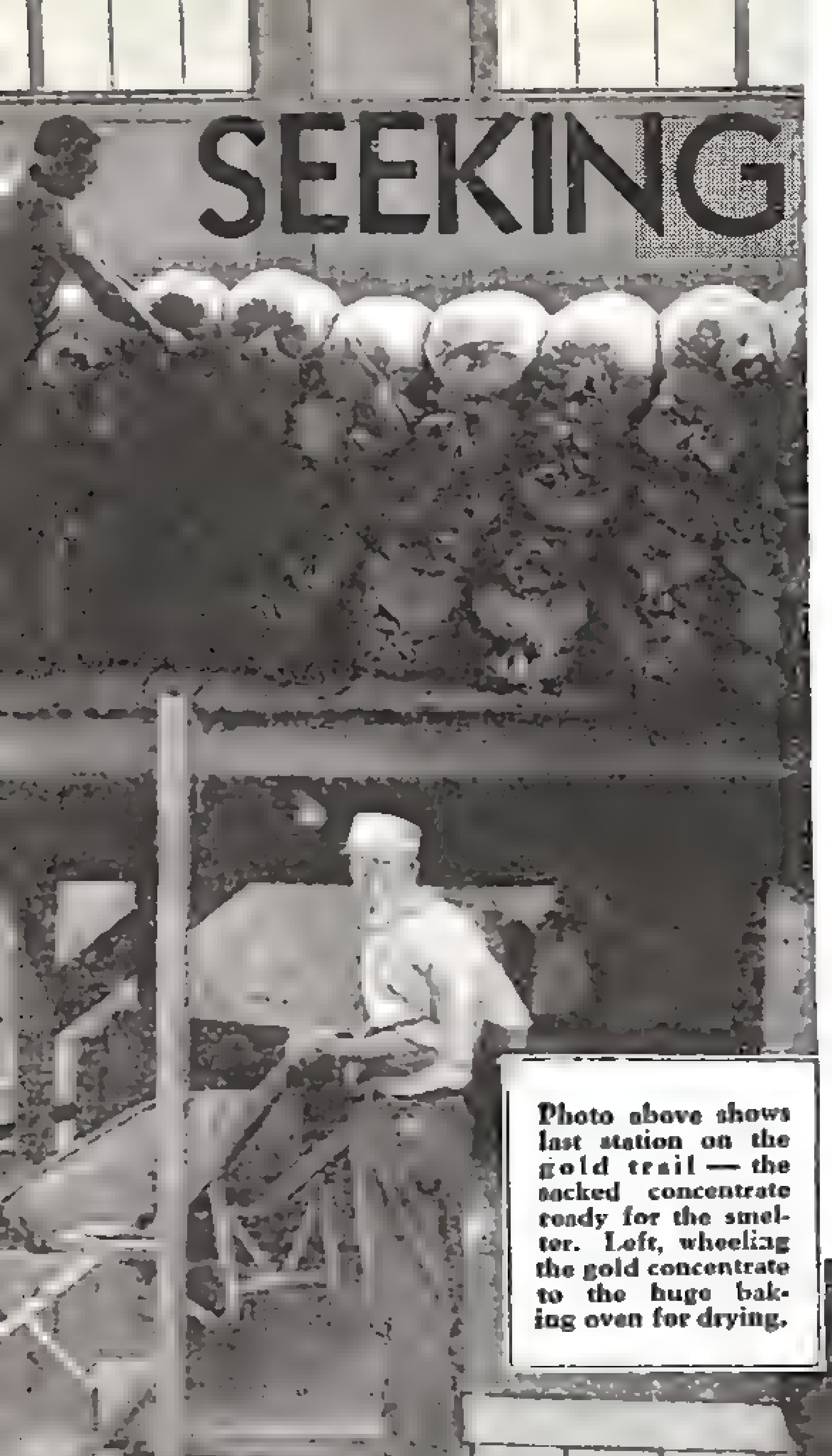
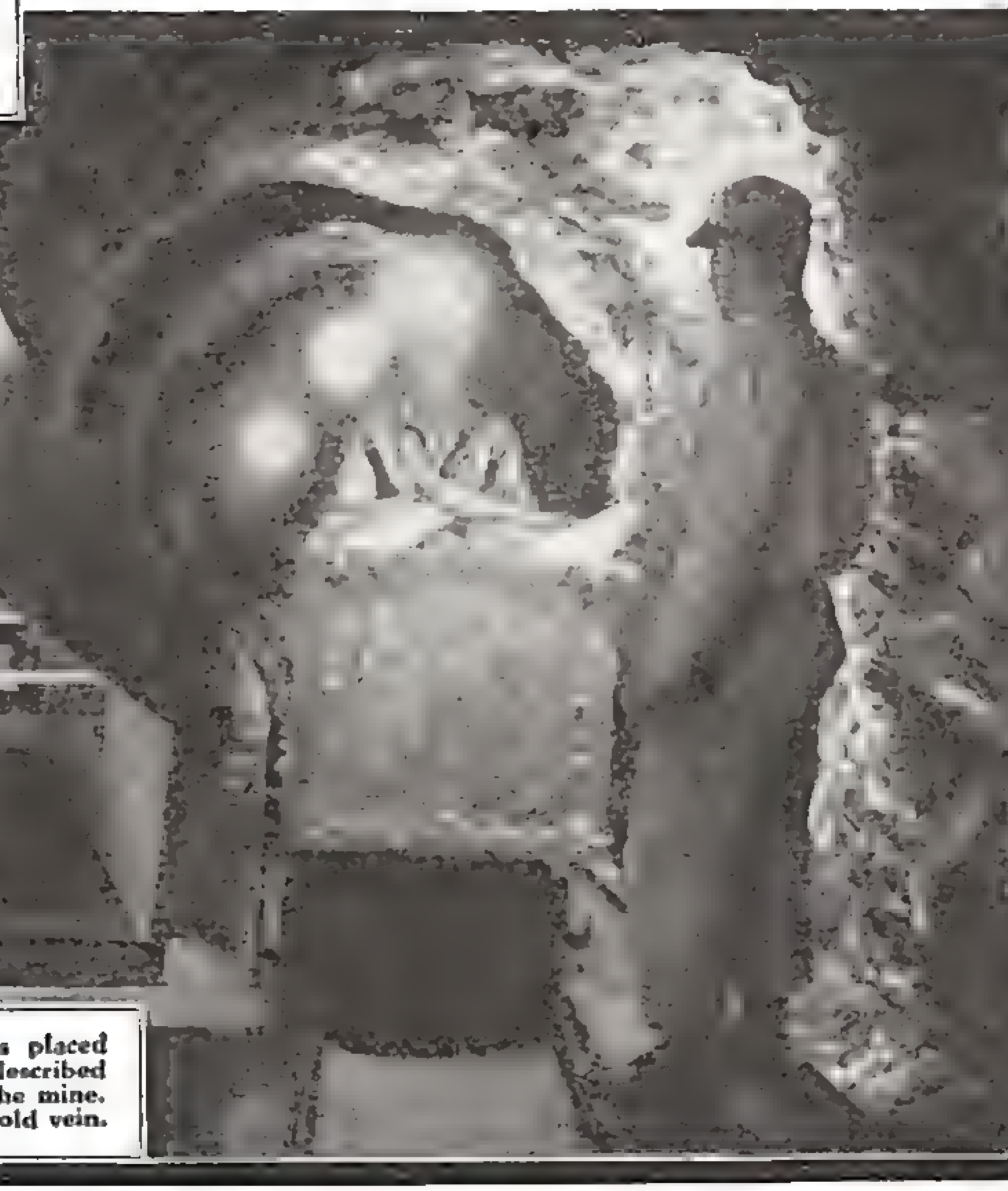
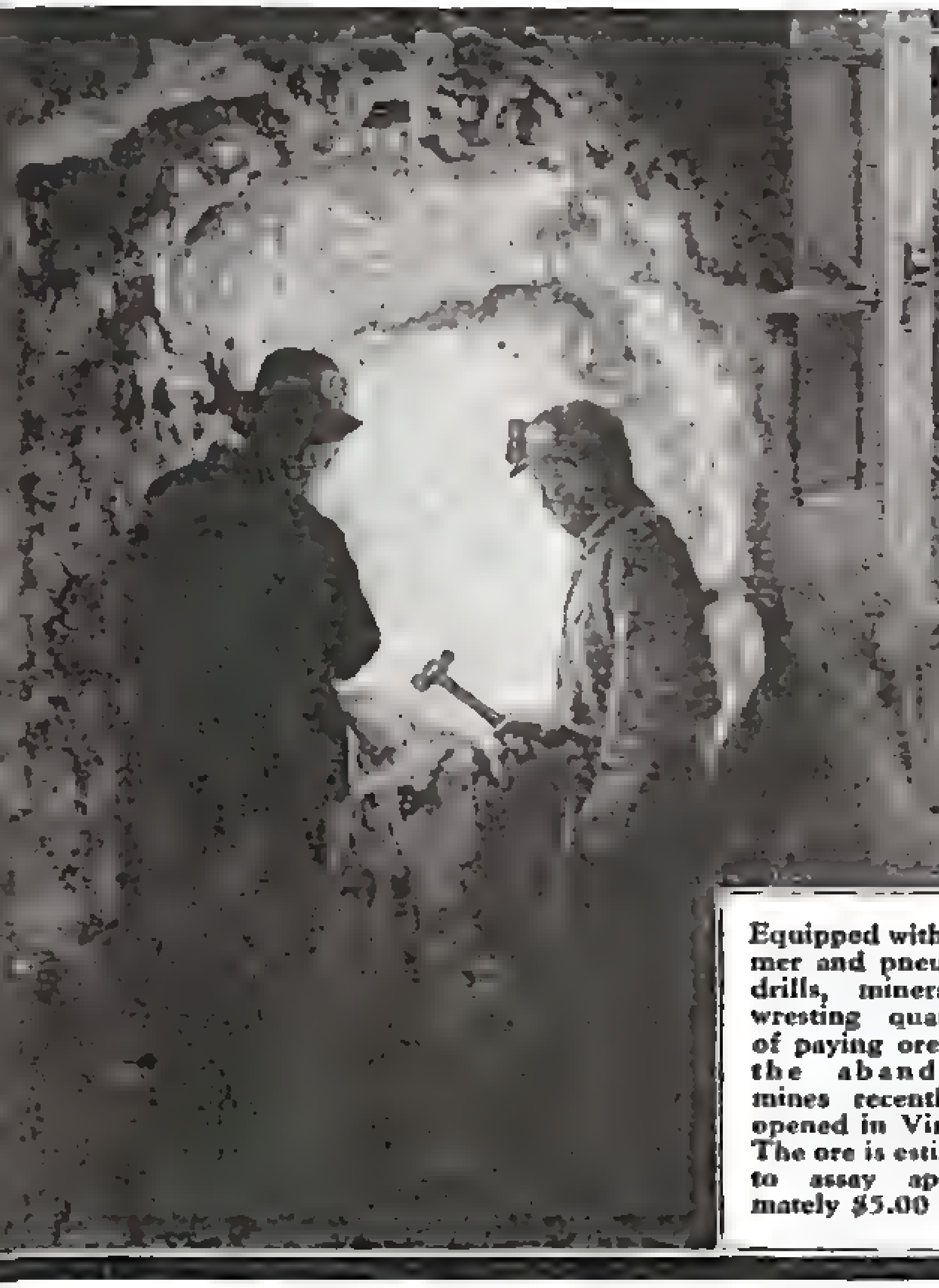


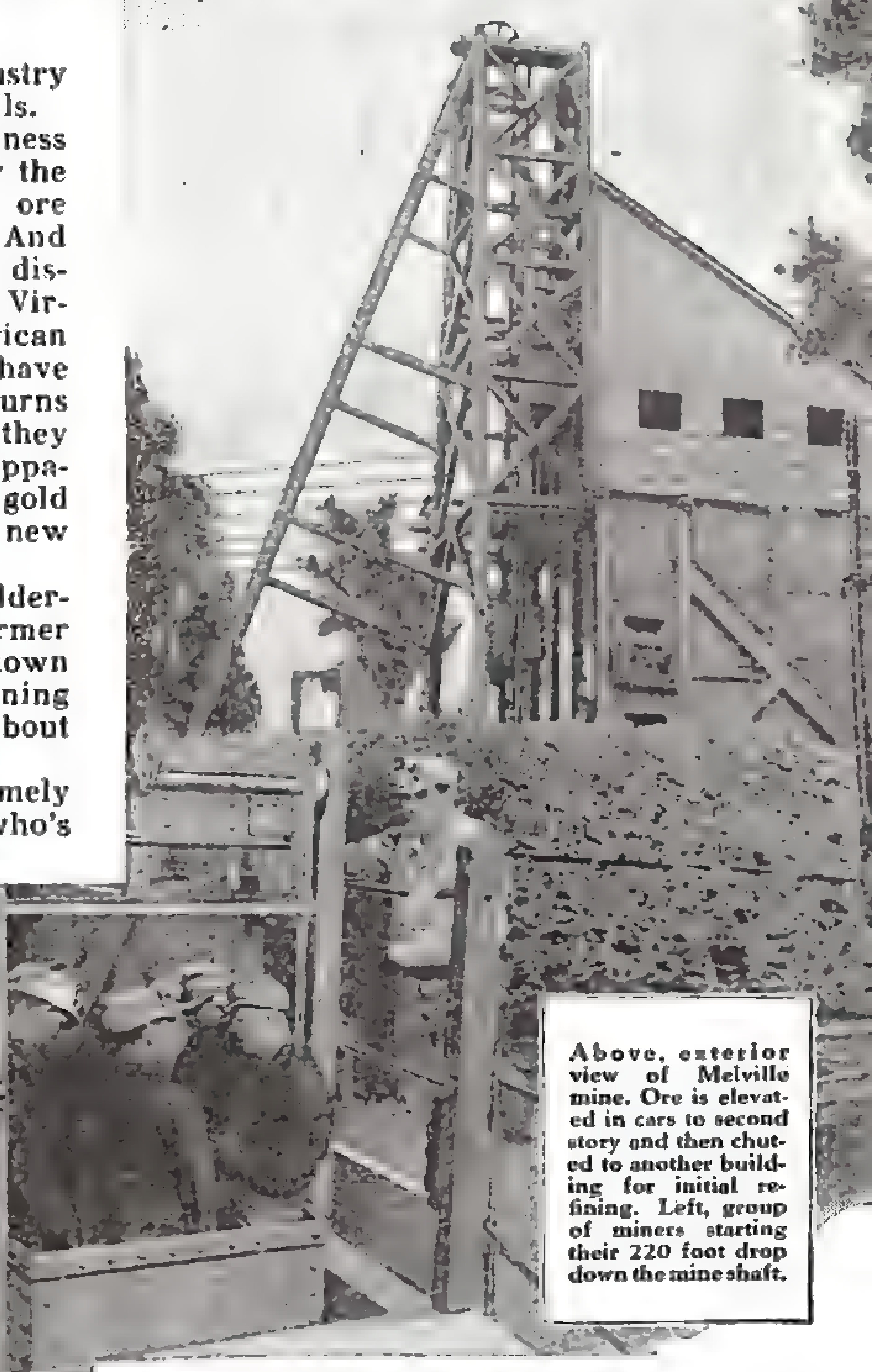
Photo above shows last station on the gold trail — the sacked concentrate ready for the smelter. Left, wheeling the gold concentrate to the huge baking oven for drying.



Into the revolving masticator shown above, the ore is placed and broken down preparatory to the "flotation" process described in the text. At right, one of the tiny ore cars, deep in the mine. Thus far, about 1600 tunnels have been laid along the gold vein.



Equipped with hammer and pneumatic drills, miners are wresting quantities of paying ore from the abandoned mines recently reopened in Virginia. The ore is estimated to assay approximately $5.00 a ton.



Above, exterior view of Melville mine. Ore is elevated in cars to second story and then chuted to another building for initial refining. Left, group of miners starting their 220 foot drop down the mine shaft.

All photos taken exclusively for MODERN MECHANIX AND INVENTIONS by Lindquist, Washington, D. C

FOLLOWING THE TRAIL OF PRECIOUS METAL IN THE NATION'S NEWEST GOLD DIGGINGS

Previewing AMERICA'S 1935 AUTOMOBILES

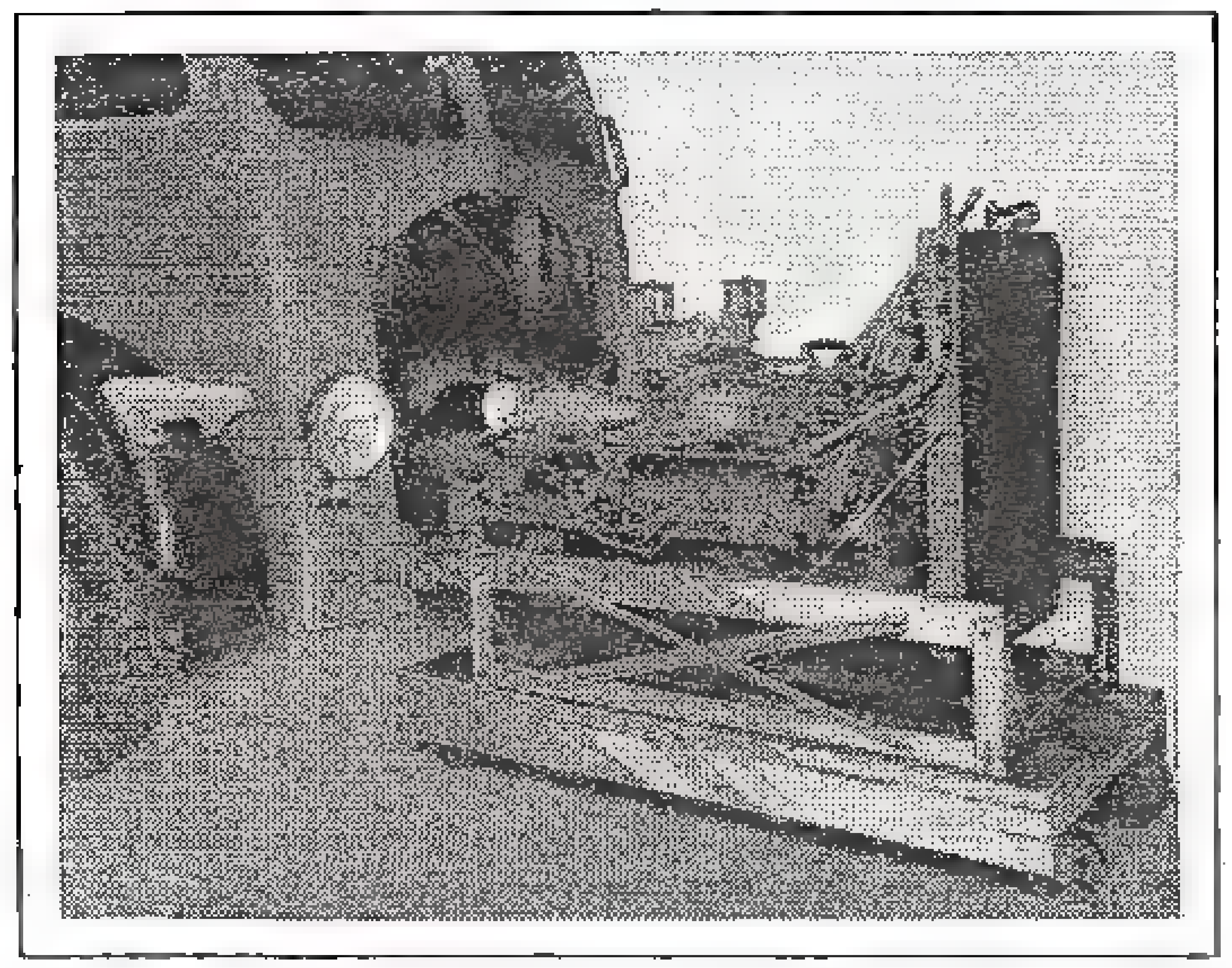
by GLENN JENKINS

Streamlines continue to hold the spotlight. Chrysler's "bull nose" hood is said to be out, and the "hound's nose" is in. Beaver-tails are bigger and broader, anticipating the rear-mounted engine. Here is the latest advance information on America's 1935 automobile—how it is built and what it will look like.

MANY new and important improvements have been built into the new 1935 automobile models. Greatest strides have been made in engineering, rather than design, although the latest cars show a decided continuation of the streamline idea, emphasizing refinement of the so-called flowing lines which startled motordom last year.

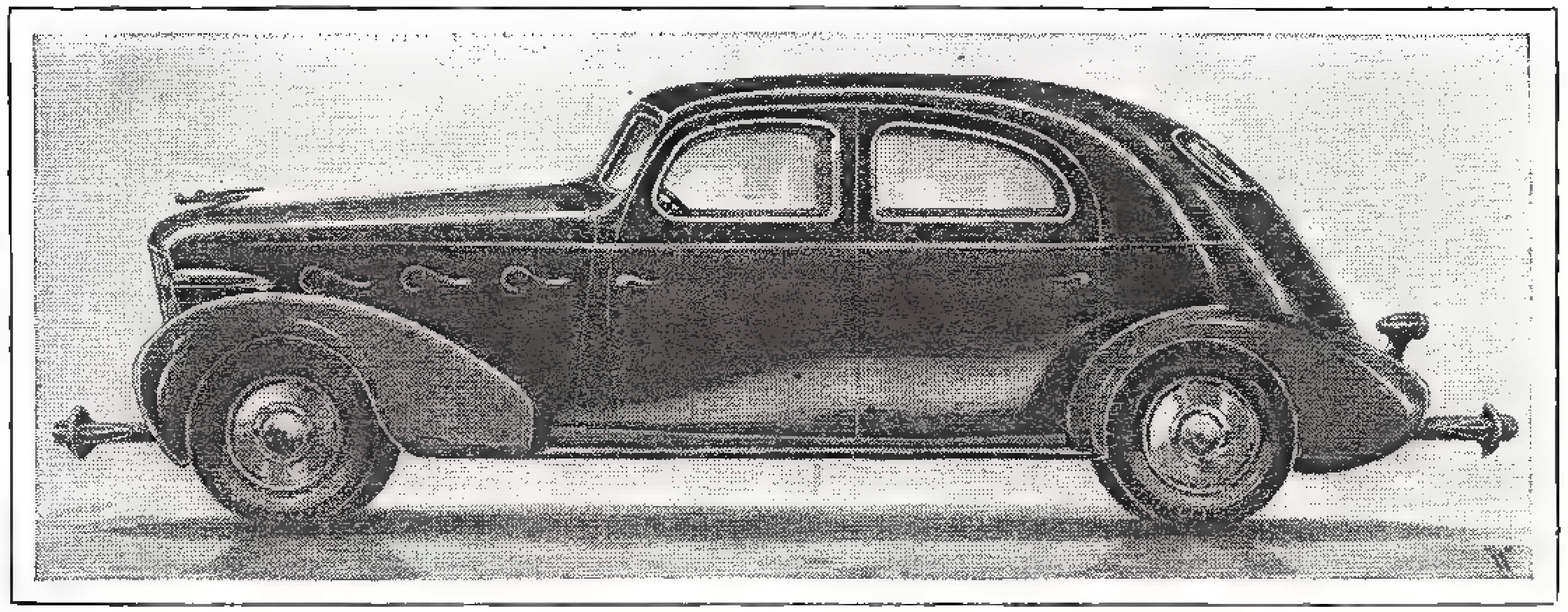
Engineers, through discovery and invention, have been able to add from 25,000 to 50,000 miles to the life of the average car. As a matter of fact, more real engineering is now going into the light car than ever, because the competition there is keener and every manufacturer is straining himself to give the most for the money.

Greatest interest this year centers around the Chrysler group, which includes Plymouth, Dodge, DeSoto and Chrysler models. The airflow lines, when they are seen for the first time at the New York Show, will have undergone refinement. Chrysler engineers have made it known that the airflow trend is scientifically correct and they will continue in that direction. Therefore, changes, according to advance information, will be in refinement of the front end to do away with the "bull nose." The car of the future, according to Chrysler designers, will have a nose like that of a hound, outstretched and going places in a hurry. The tendency is to design lines and contours that will give the impression of speed even though a car may be standing still.



White introduces a truck engine with horizontally opposed cylinders, which can be pulled out on a dolly.

The most pronounced development of the year is the treatment of the rear ends of many models. The beaver tail is more affected and refined. The reason for this, as explained by one leading designer, is to get the public accustomed to this style, because the beaver-tail lines are necessary to house the engine in the event that it is moved from under the hood to the rear axle.



Chrysler engineers have definitely adopted the airflow principles, but advance information indicates that the "bull nose" is doomed and will be superseded by the "hound's nose" design similar to that illustrated in the photo above.

Henry M. Crane, technical assistant to the president of General Motors, gives an intimation of the attitude of GM by declaring that only gradual changes in car design are being undertaken. General Motors points to Cadillac and LaSalle design as its ideal of streamlining, and is expected to follow this trend.

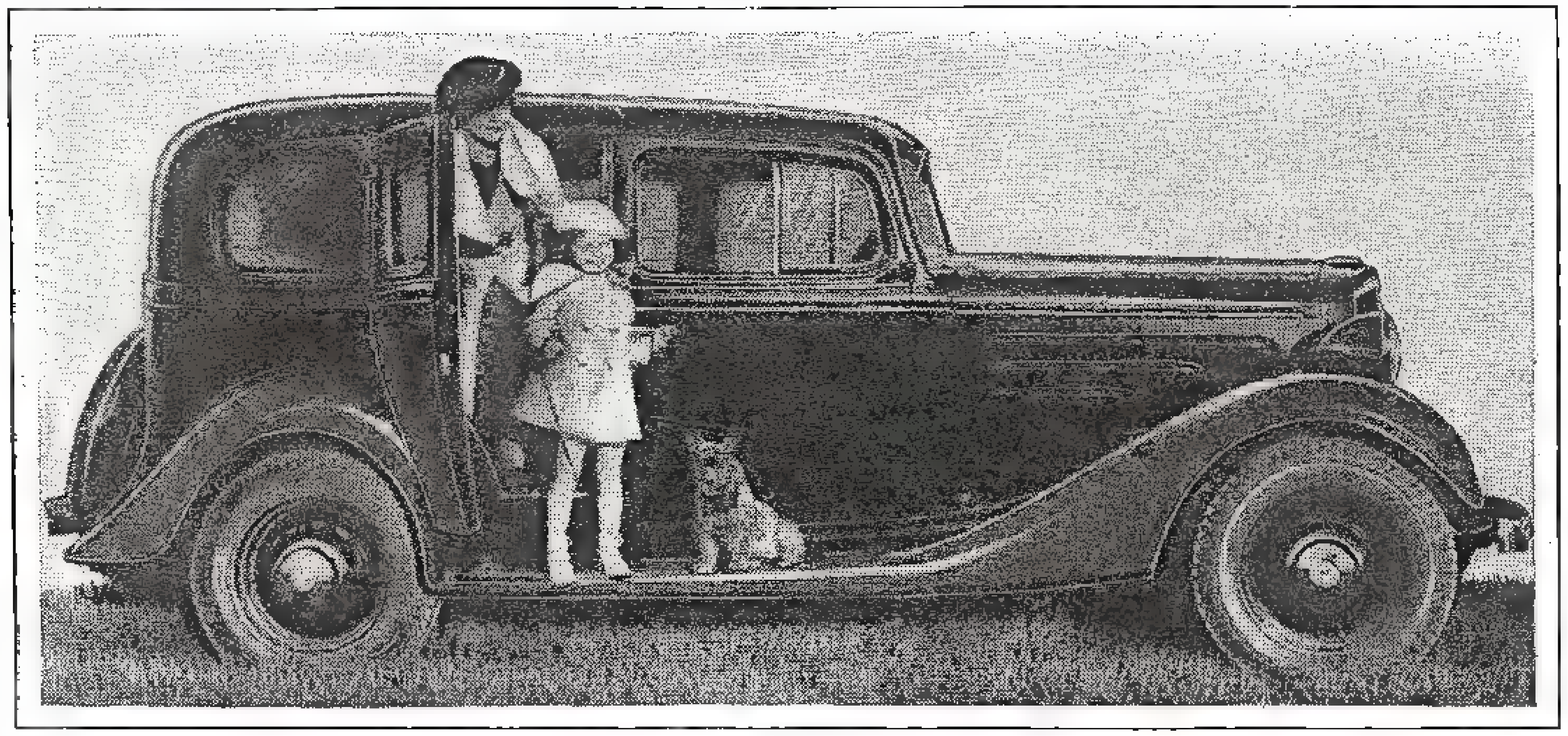
Mr. Crane declares that improvement in brakes have not kept pace with speed increase, and much must be done to effect needed changes, though radical departures seem to him as unlikely. Wider use of cast iron drums is anticipated and much needs to be done to assure uniformity of brake action under varying weather conditions.

Packard engineers have solved the problem of designing louvres in keeping with the streamline trend by locating them under the front fenders. Heat from the motor passes through these louvres, travels along the under side of the fender and away from the body, excluding motor heat from the car's interior. The new treatment affords designers more freedom in handling the ornamental space formerly occupied by the louvres. Another new Packard feature is a model seating nine passengers—three on the back seat, three on the folding seats and three in front. Persistent rumors also indicate that Packard will produce a light car destined to offer competition in the medium-priced field.

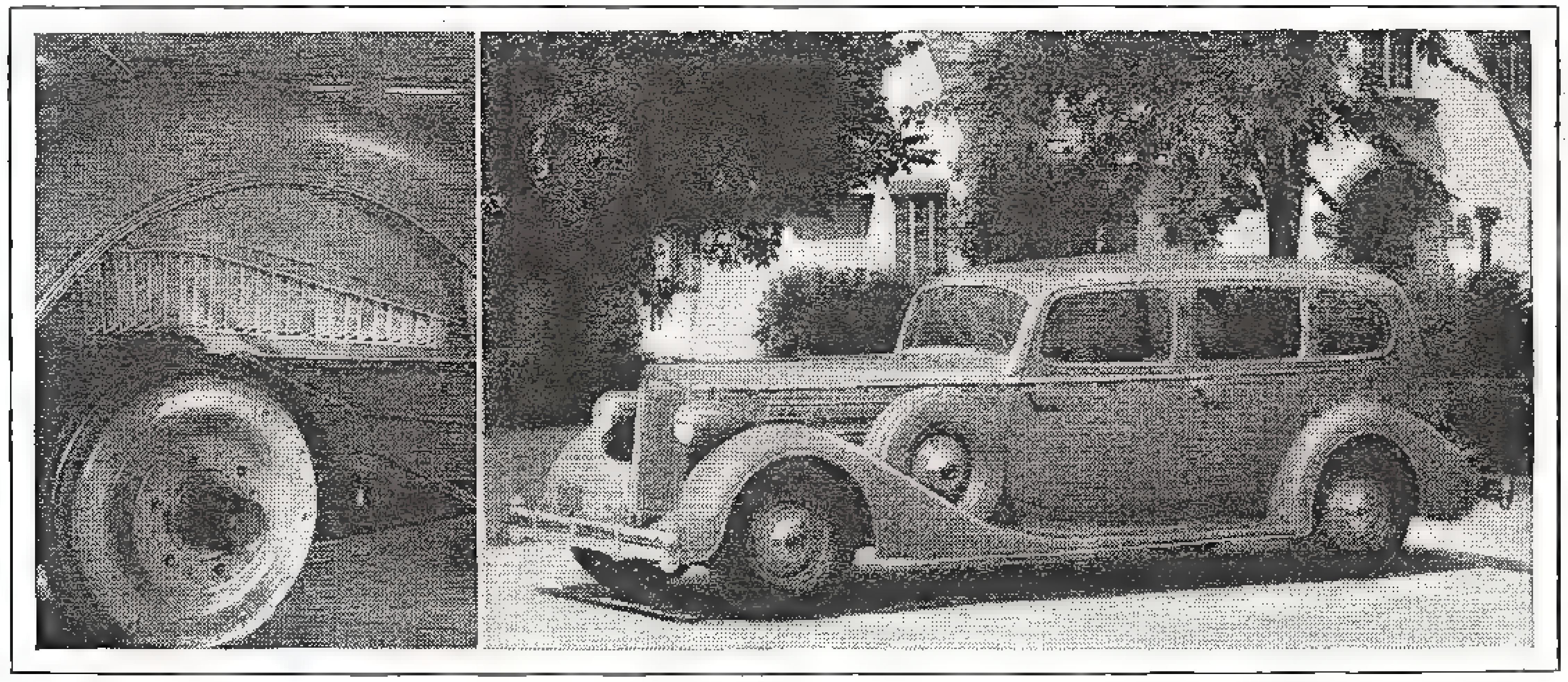
Hupmobile's most startling announcement for 1935 is the inclusion in its line of a 5-passenger, 4-door sedan which lists at less than $700. The new model develops 91 h.p. and has a 117 inch wheelbase. Power brakes are a feature of all models in the 1935 Hup line.

One of the most unique developments for 1935 is the "pancake" truck engine announced by the White Motor Company, a

(Continued on page 128)



Chevrolet broadens its line with a new four-door, five-passenger sedan, said to set a new price low in the six and eight cylinder field. Extra leg room for rear seat passengers is provided in the new models by recessing back of front seat.



Left—How Packard engineers solved the problem of designing louvres in keeping with streamline trends by placing them under the front fender. Note that louvre space is ornamentally treated in the new Packard shown at the right.

ANALYZING HOCKEY—FASTEST *Game on Earth*

by JOHN C. HOFFMAN

Voss, of New York Rangers, outwits Toronto Maple Leaf defense to score a brilliant goal. Note cage construction.

HUMAN speed reaches its athletic peak in the fastest game on earth—hockey.

No other sport even remotely approaches it in tempo. For hockey is a game of human meteors on bladed lightning—a dazzling spectacle of split-second thrills, almost too fast for ordinary eyes to follow.

Any hockey spectator knows that the object of the game is to put the puck into the enemy's goal. How and why it gets there is generally a mystery to the uninitiated. With this in mind, we shall go behind the scenes and see just what it is that makes the game click.

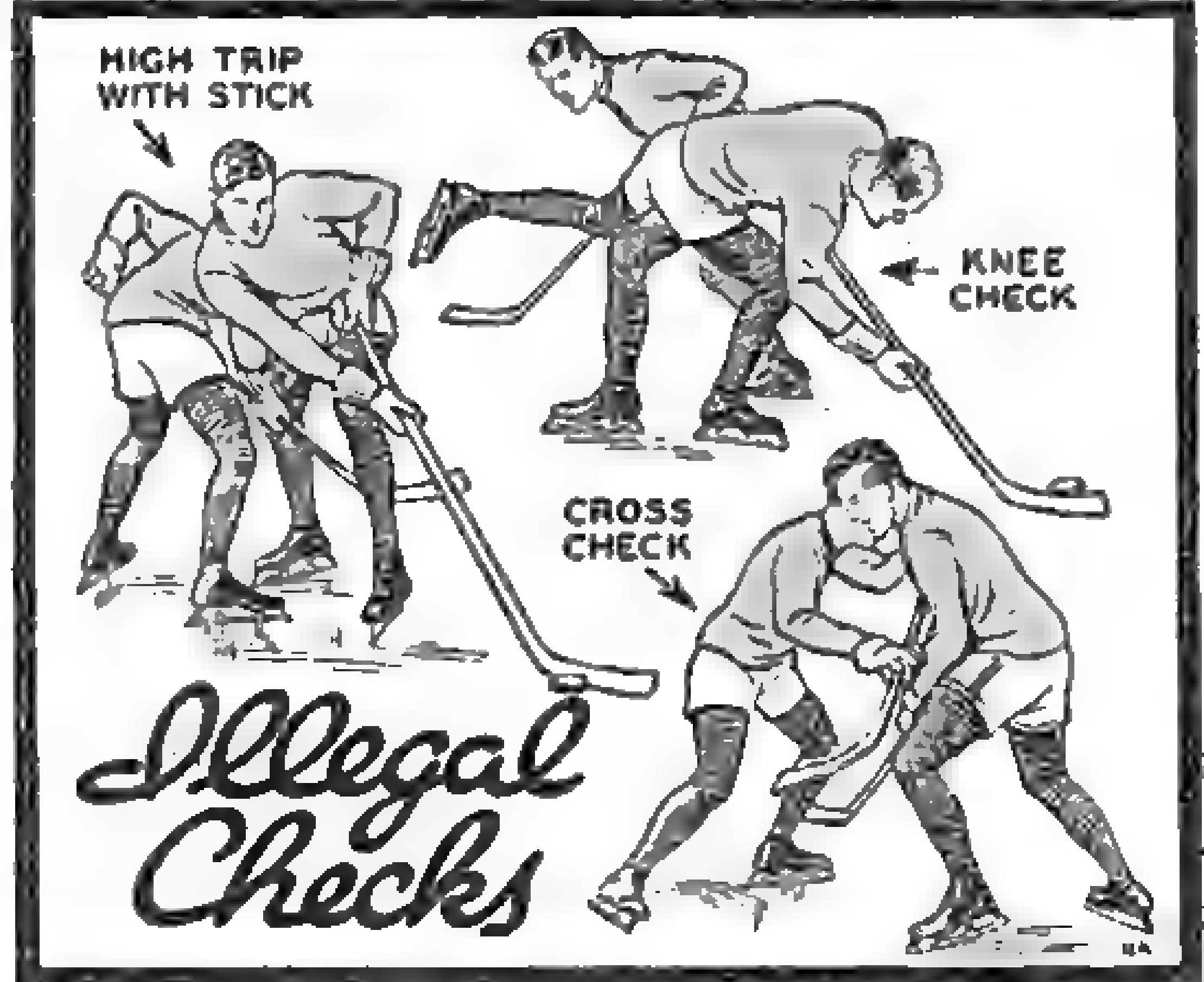
Hockey, of course, is played by six-man teams on sheets of ice commonly known as rinks. When games are played indoors—the general custom in the United States—the measurements of the rink may be regulated by the size of the building; but in general the playing surface is 200 feet long and 85 feet wide. A wooden fence, 4½ feet high and preferably white in color, surrounds the arena.

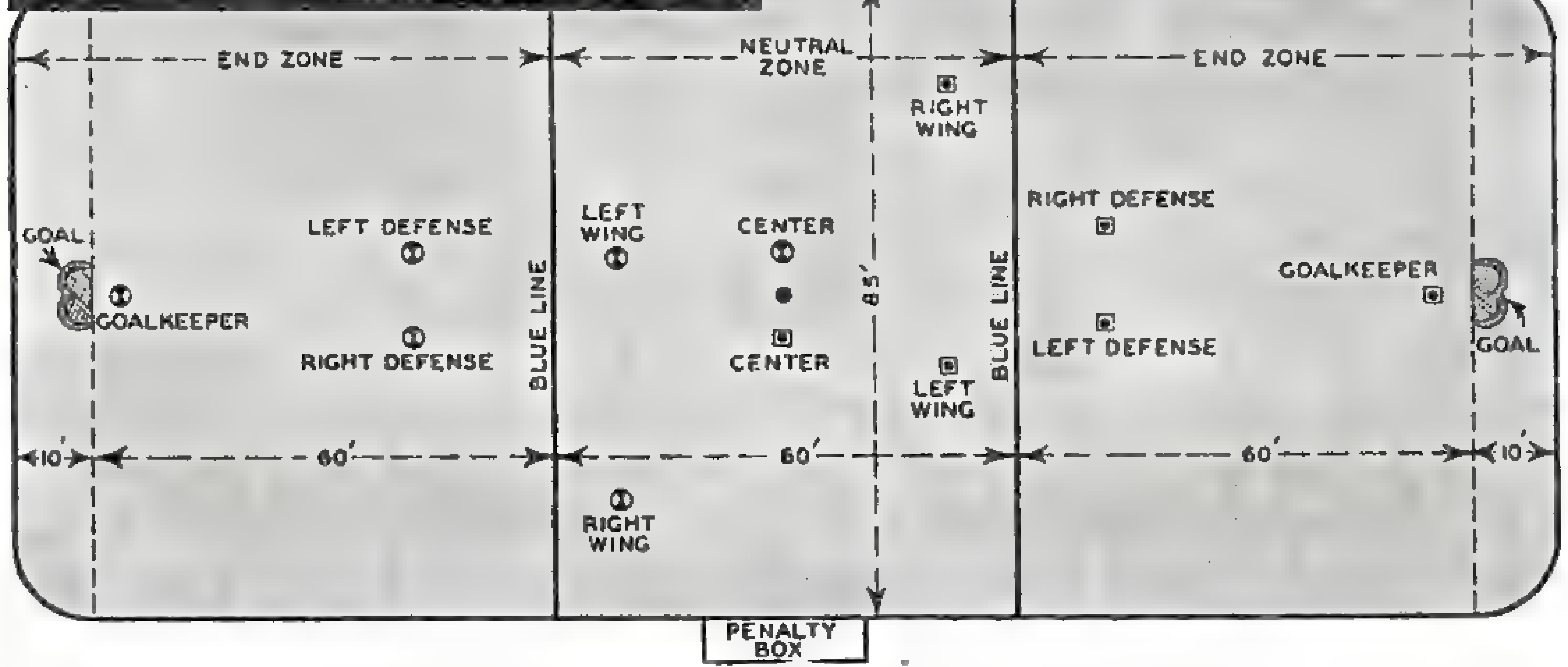
The goals are located from 10 to 15 feet from the ends of the rink and in the center of a line drawn across the ice. The goal posts are set 6 feet apart with a red line—the official goal line—connecting them. Back of the goal line, of course, is a netted cage to catch the puck.

The ice area between the two goals is divided into three sections by a blue strip extending across the rink, 60 feet out from the goal lines. The center section is known as the neutral zone and the end zones are variously known as "defensive" or "attacking" zones.

The six men who comprise the team are known as goalie, center, left and right wings and

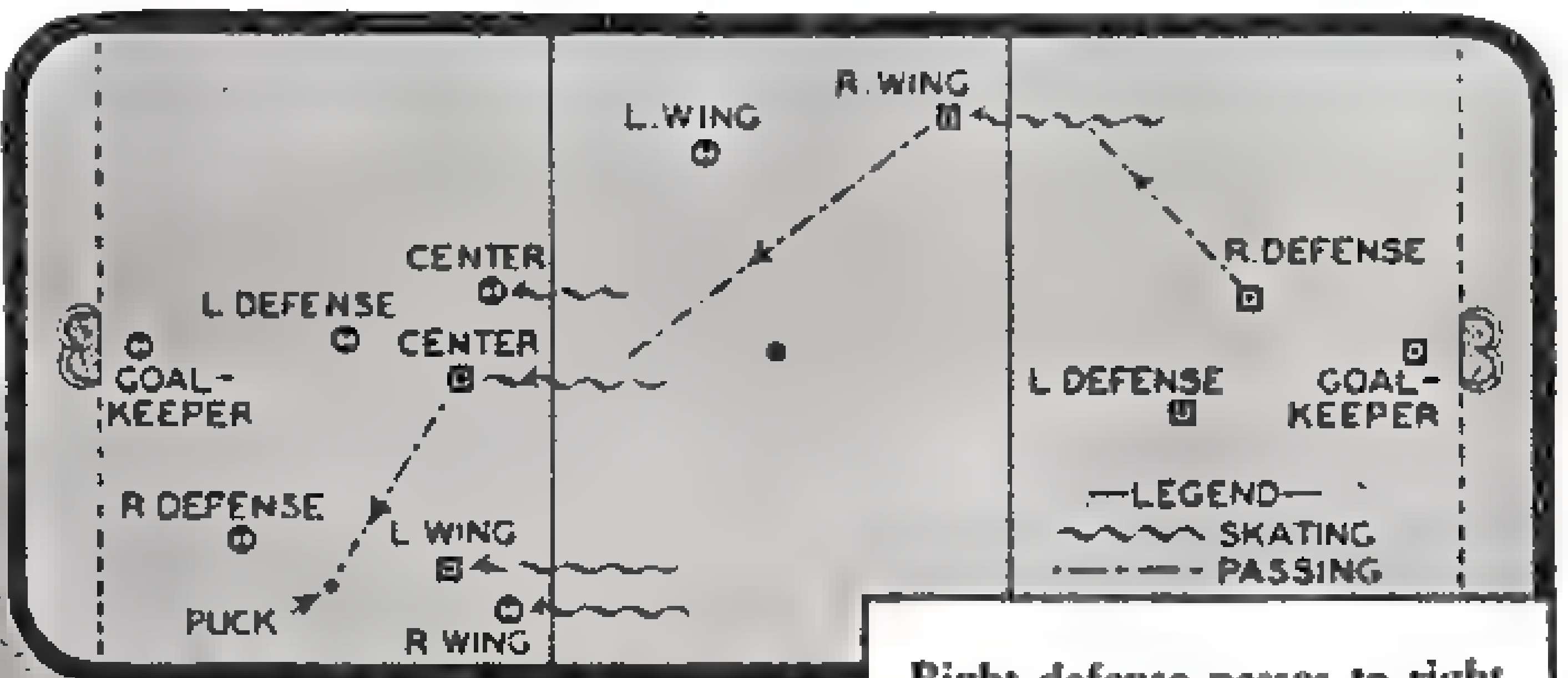
(Continued on page 137)


HIGH TRIP WITH STICK
KNEE CHECK
CROSS CHECK
Illegal Checks


PLAYERS BOXES
END ZONE
NEUTRAL ZONE
END ZONE
RIGHT WING
GOAL
LEFT DEFENSE
LEFT WING
CENTER
RIGHT DEFENSE
GOALKEEPER
GOALKEEPER
BLUE LINE
85'
BLUE LINE
CENTER
LEFT DEFENSE
RIGHT DEFENSE
LEFT WING
GOAL
10'
60'
60'
60'
10'
RIGHT WING
PENALTY BOX

Drawing shows general layout of hockey rink with positions of players at the face-off which begins each period. The insert of the skating figures shows three common fouls which cause removal from game for a given time.

Note that goalie (with uplifted stick) has left cage in this thrilling skirmish, to check the enemy's scoring drive.


L.WING
R.WING
CENTER
L.DEFENSE
CENTER
R.DEFENSE
GOAL-KEEPER
L DEFENSE
GOAL-KEEPER
R DEFENSE
L WING
PUCK
R WING
—LEGEND—
SKATING
PASSING

Right defense passes to right wing who skates across zone line and passes to center. Latter skates toward goal, suddenly passes to the left wing who has entered the end zone with puck movement—a typical pass play.

Charlie Gardiner, late goalie of the Chicago Blackhawks, has just checked a vicious enemy drive. Arrow points to puck as it struck Gardiner's body. Note heavy trappings necessary for protection against the mile-a-minute pucks.

Building World's Largest Earth Fill Dam

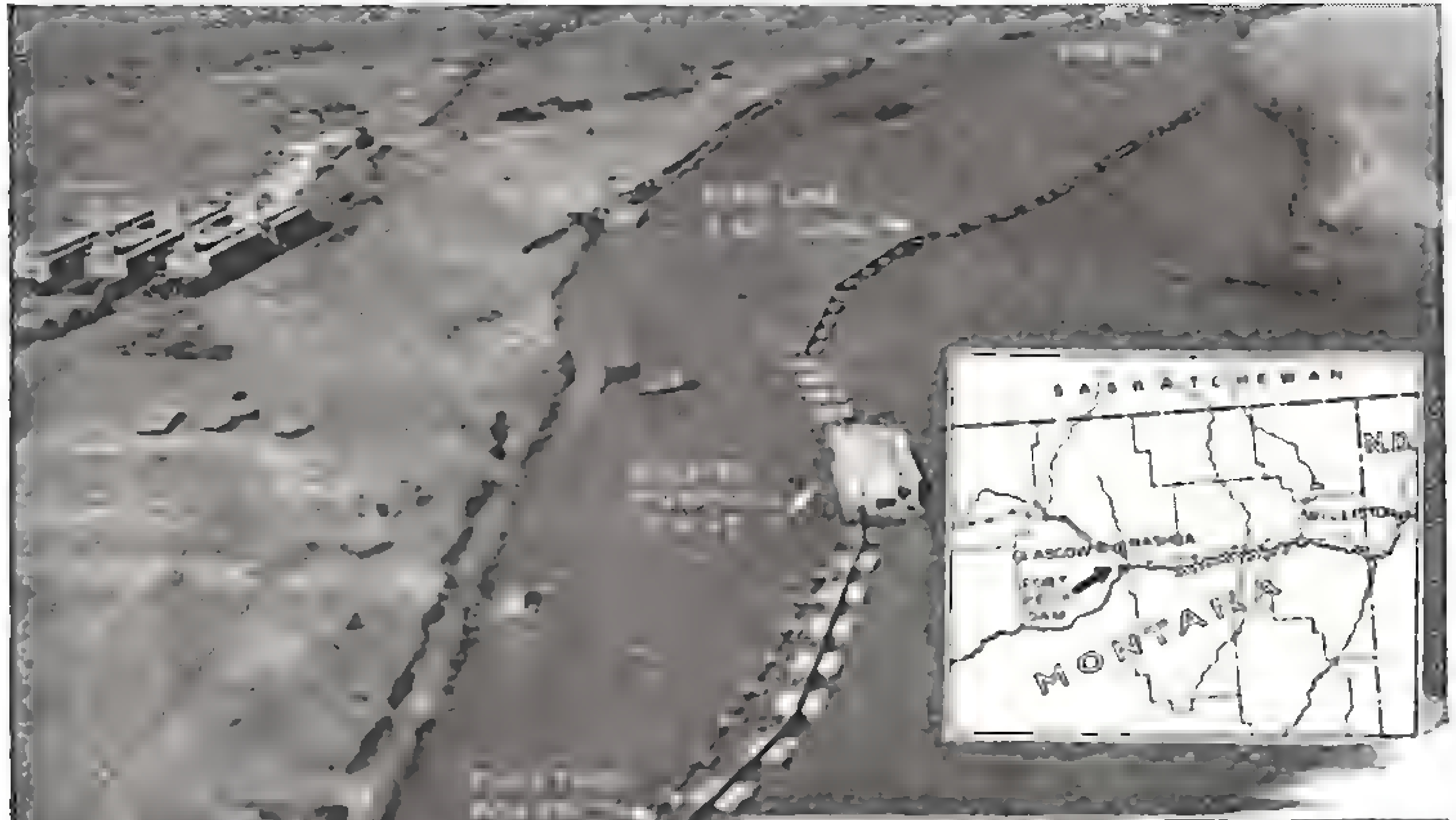

SASKATCHEWAN
N.D.
MONTANA
GLASGOW
FORT PECK DAM

Photo shows one of four units which will pump 90,000,000 cu. yds. of earth into Fort Peck dam. Three other dredges are under construction, upper left. Smaller pontoons support 154,000 volt power line from Great Falls, Montana.

Four years hence this bridge will disappear as dam rises, filled by earth from a battery of 28-inch pipes as shown above. Map insert shows location of the mammoth project.

AT a point in eastern Montana where crowding bluffs force the winding Missouri river through a natural bottleneck, army engineers are engaged in one of the most gigantic projects of modern times—the building of the Fort Peck Dam, largest earth fill barrier in the world.

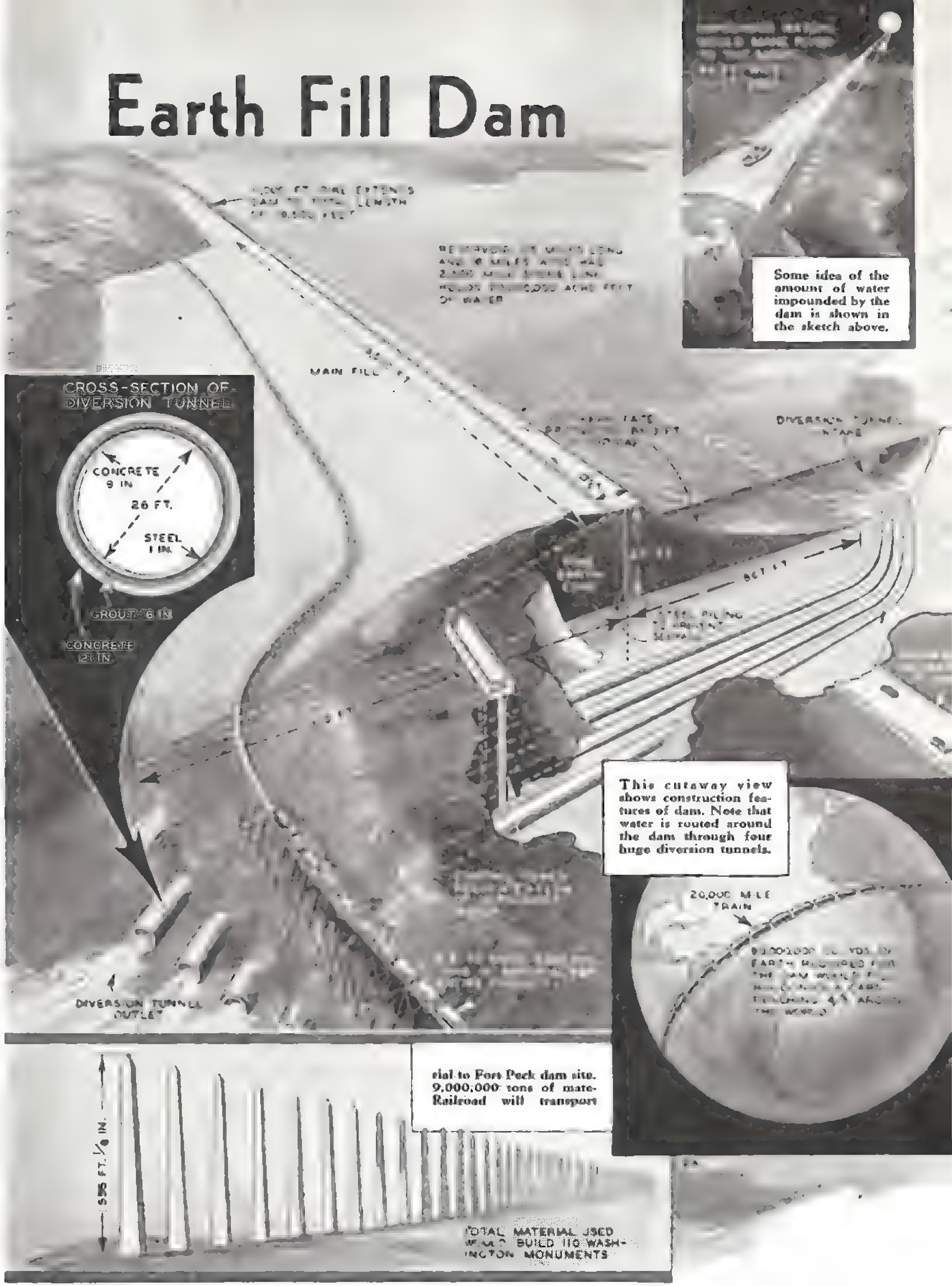
Not even Boulder Dam, Titan of the Southwest, eclipses the Fort Peck structure for sheer magnitude. For when the massive earthen wall is completed, the rampaging Missouri will be held in check by a mighty barrier almost four miles long.

From a sturdy base measuring 2677 feet from upstream to downstream toe, the twin slopes of the dam proper will rise 231 feet above the river bed to form the dam's crest, 100 feet wide. Across the main channel, engineers are throwing a main fill 8500 feet wide, to join a low dam, or dike which will march 11,000 feet up the west bank, for a total length of 19,500 feet.

The most unusual feature of the $72,000,000 project is the choice of construction material. A 3-foot facing of concrete and rip-rap will protect the upstream slope, but the main body of the dam will be composed of earth fill—90,000,000 cubic yards of it, which will be pumped into position by a battery of dredges.

Held in check by this mighty wall of earth and stone will be a giant reservoir, 175 miles long and 16 miles wide. This huge lake will flood a district of about 380 square miles—250,000 acres—to a maximum depth of 230 feet. Boasting a shoreline of about 2500 miles, the Fort Peck reservoir will impound the staggering total of 20,000,000 acre feet of water, an amount which

(Continued on page 140)


MAIN FILL
CROSS-SECTION OF DIVERSION TUNNEL
CONCRETE 9 IN
26 FT.
STEEL 1 IN.
GROUT 6 IN
CONCRETE 21 IN
DIVERSION TUNNEL INTAKE
DIVERSION TUNNEL OUTLET
20,000 MILE TRAIN
535 FT. 1/8 IN.
TOTAL MATERIAL USED WOULD BUILD 110 WASHINGTON MONUMENTS

Some idea of the amount of water impounded by the dam is shown in the sketch above.

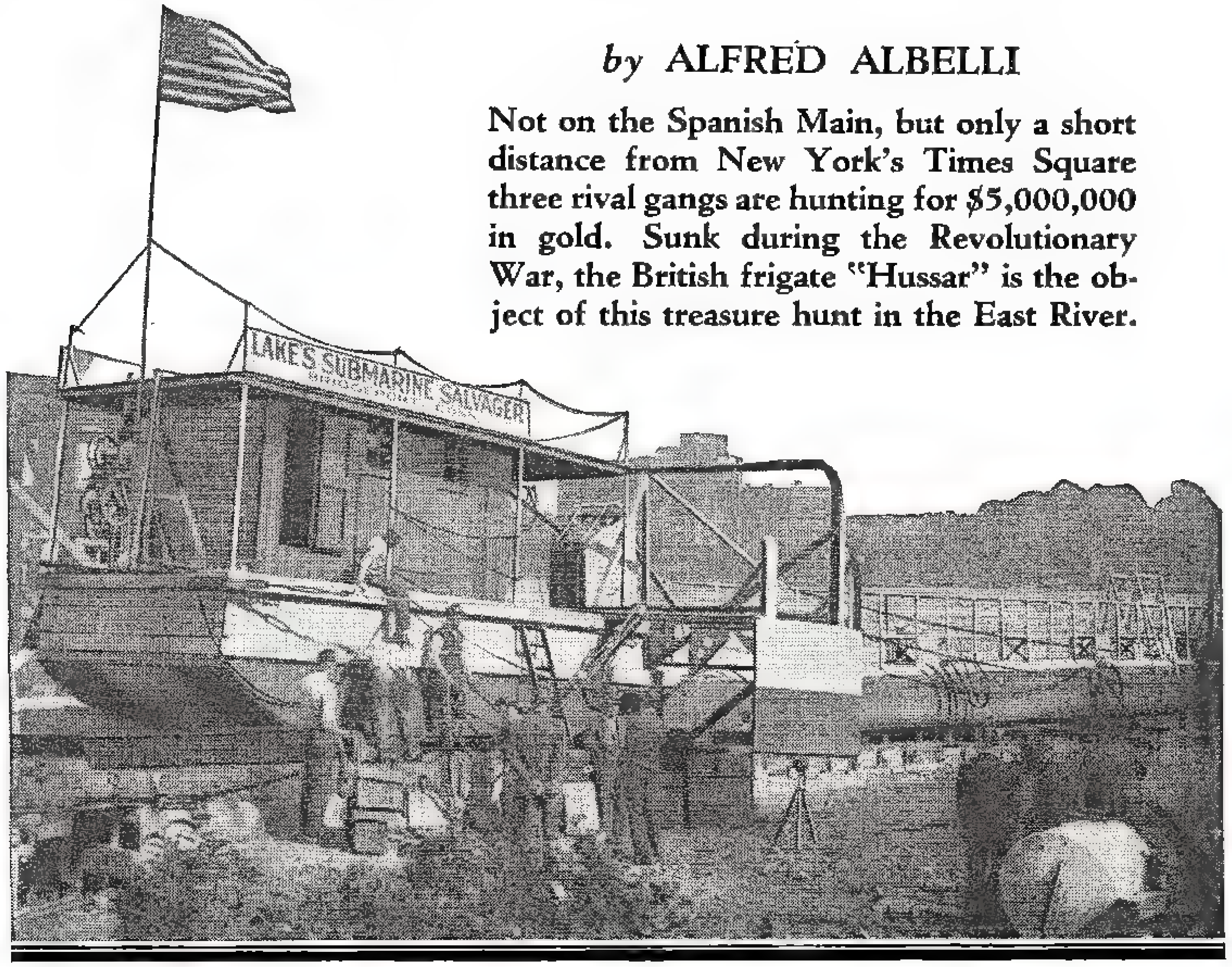
This cutaway view shows construction features of dam. Note that water is routed around the dam through four huge diversion tunnels.

rial to Fort Peck dam site.
9,000,000 tons of mate-
Railroad will transport

Seeking SUNKEN GOLD 15 Minutes from Broadway

by ALFRED ALBELLI

Not on the Spanish Main, but only a short distance from New York's Times Square three rival gangs are hunting for $5,000,000 in gold. Sunk during the Revolutionary War, the British frigate "Hussar" is the object of this treasure hunt in the East River.



Here is the unusual submarine salvage ship "Laksco," invented and designed by Simon Lake primarily for salvaging cargoes from sunken vessels. With it he hopes to find the $5,000,000 gold treasure lying on East River's bottom.

THREE rival salvage gangs—modern treasure-hunters—are now engaged in a nip-and-tuck race to locate the sunken hulk of the British frigate *Hussar* which went to the bottom of the East River, Manhattan, with a $5,000,000 gold cargo on Nov. 23, 1780.

This sensational treasure hunt is raging in a section which is only a five-cent subway fare from Broadway—and not on the Spanish Main where quests for sunken gold have held the glamor in past exploits.

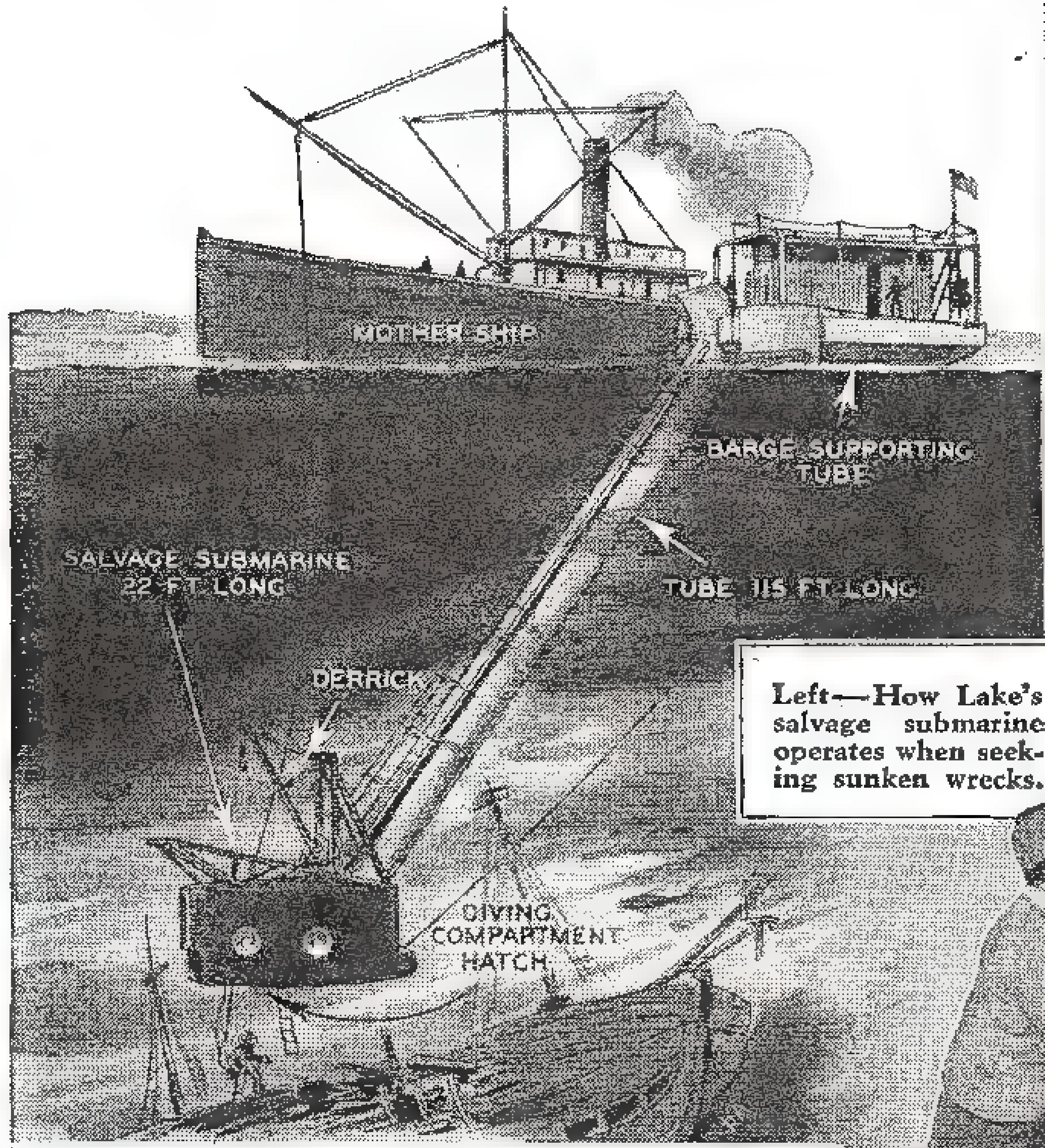
The *Hussar* reposes beneath the turbulent waters of Hell Gate in the East River. Hell Gate is the nickname given for this section of the water-way because of its perilous currents and treacherous whirlpools. Each year it claims a toll of at least 15 vessels. Some of the worst catastrophes in Manhattan's maritime history have occurred in Hell Gate.

The *Hussar* went down with 107 men on board. There were no survivors. The vast amount of gold coin was intended for the British army forces quartered near New York during the American Revolution.

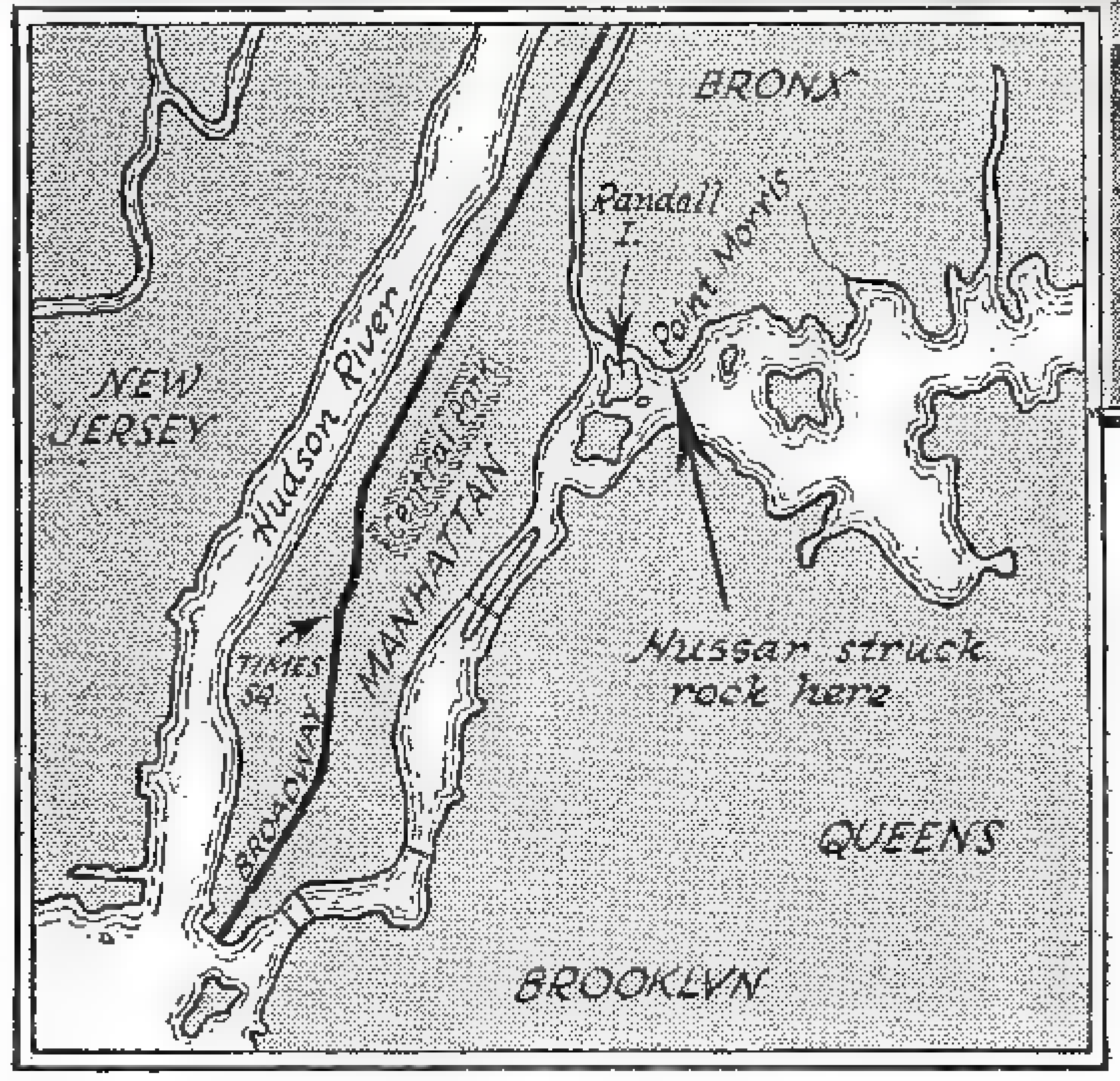
In September, 1780, according to records in musty archives, the *Hussar* anchored alongside the H.M.S. *Mercury* off the Bronx shore. The *Mercury* had also been sent to pay off the British soldiers. As the *Hussar* was considered a more rugged craft, better qualified to weather the terrors of Hell Gate, as well as any traps set by the Colonial rebels, the *Mercury* transferred her treasure chests to the *Hussar*.

In passing Point Morris, the *Hussar* struck the protruding Pot Rock, tore a huge hole in her bottom and started to fill rapidly. Instantly, the captain steered for shore. In the absence of beaching places, the skipper sent a line ashore by small boat. The line was firmly fastened to a tree at one end and to the sinking *Hussar* at the other.

It was the captain's plan to keep the *Hussar* floating in comparatively shallow water until the money could be taken ashore. But the rope snapped and the ship went down. It so happens that on this side of the river there is a shelf which runs along under the water, hewn out of the island by nature. This bar drops suddenly from 17 to 80 feet.



Left—How Lake's salvage submarine operates when seeking sunken wrecks.



Some of the navigators who have been trying to locate the *Hussar* believe that she went over this ledge and was dragged downstream by the heavy tide currents, and then slid over another cliff and went down to the bottom.

Although the records have placed the *Hussar's* hulk near Randall's Island, between 130th and 131st Streets, divers have not been able to find her. They have come upon several other wrecks, however, but these derelicts carried trade cargoes of coal and minerals—not gold.

Roy Hansen, noted diver, is shown being lowered into East River to continue search for the "Hussar". His diving suit was designed for the treasure hunt. Map at left shows where the "Hussar" was wrecked. The hulk of the gold laden ship is believed to be off Randall Island.

The *Hussar* has been worked for treasure ever since 1818. The crude and primitive diving equipment of those days prevented effective work in the surging tides of the roaring East River in the Hell Gate section. In 1819, the records of the present treasure-hunters further disclose, some of her guns and upper sheathing were brought up. These were retrieved, the records state, in a nest 30 feet below the bed of the river.

There have been many attempts to salvage the *Hussar* in the past twenty years. This past summer, however, three expeditions got going with a do-or-die determination, and before the passage of another sum-

(Continued on page 144)

THE SECRETS of RADIO'S SOUND EXPERTS

Modern Mechanix and Inventions Exclusive Photo

The thrilling sound of sword or saber duels is simply the clash of knife and fork. Note idle rapiers of the players while the soundman at rear near the mike holds knife and fork ready.

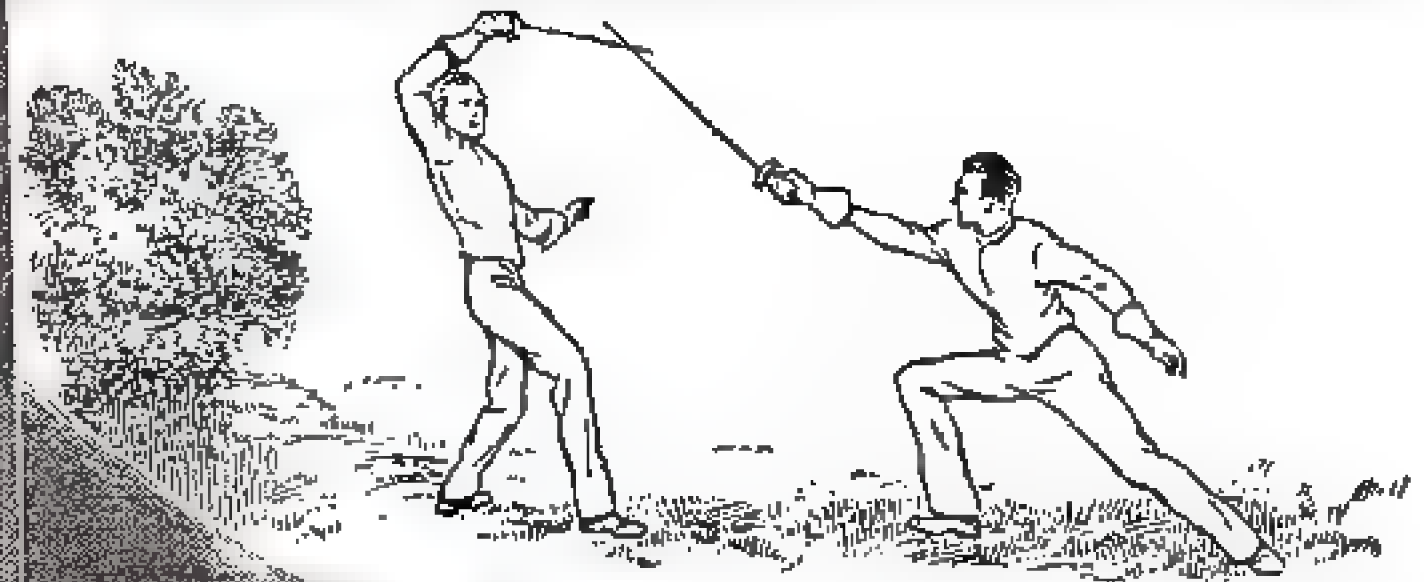
by W. L. COLLINS

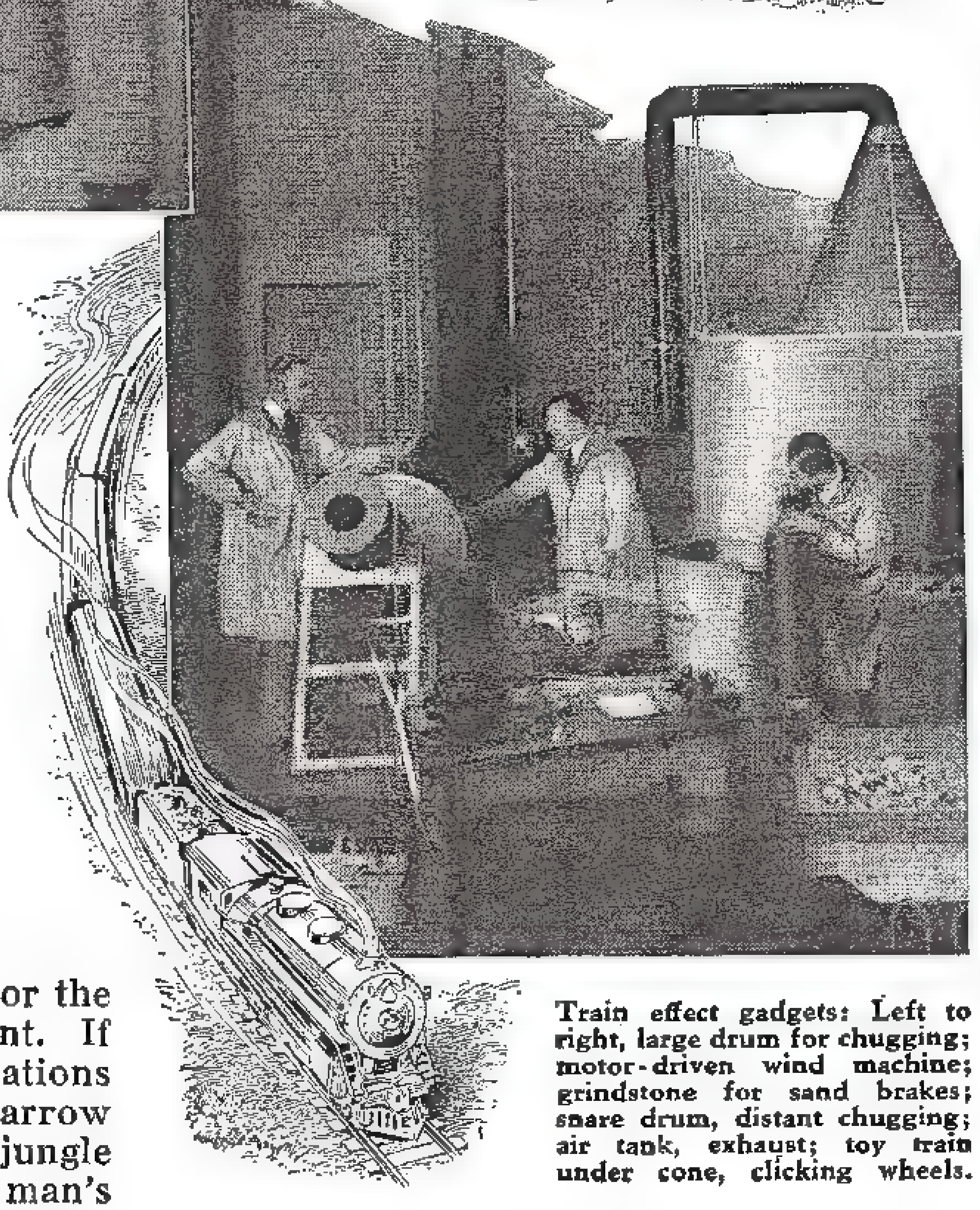
HOW did the broadcasters ever teach a tree toad to emit its mournful cry—on cue—for that outdoor program you tuned in on last night? More than likely the tree toad was Ray Kelly, NBC sound technician, plus an ordinary comb!

Mr. Kelly ran his fingers—with the proper pressure—over the teeth of the comb, and it was the cry of a tree toad to you!

The continuity writers care little for the labors of the production department. If their imagination conjures up situations calling for footsteps in the mud, an arrow imbedding itself in the heart of a jungle savage, coffee boiling, bacon frying, a man's head being split open with an ax, the writers write merrily away and trust to the ingenuity of the technicians to imitate the sounds called for by the script.

Naturally, some of these sounds must be faked; but, you say, why imitate common sounds such as a boiling coffee pot, for example? Why not put a pot of boiling coffee in front of the microphone and let it go at that?

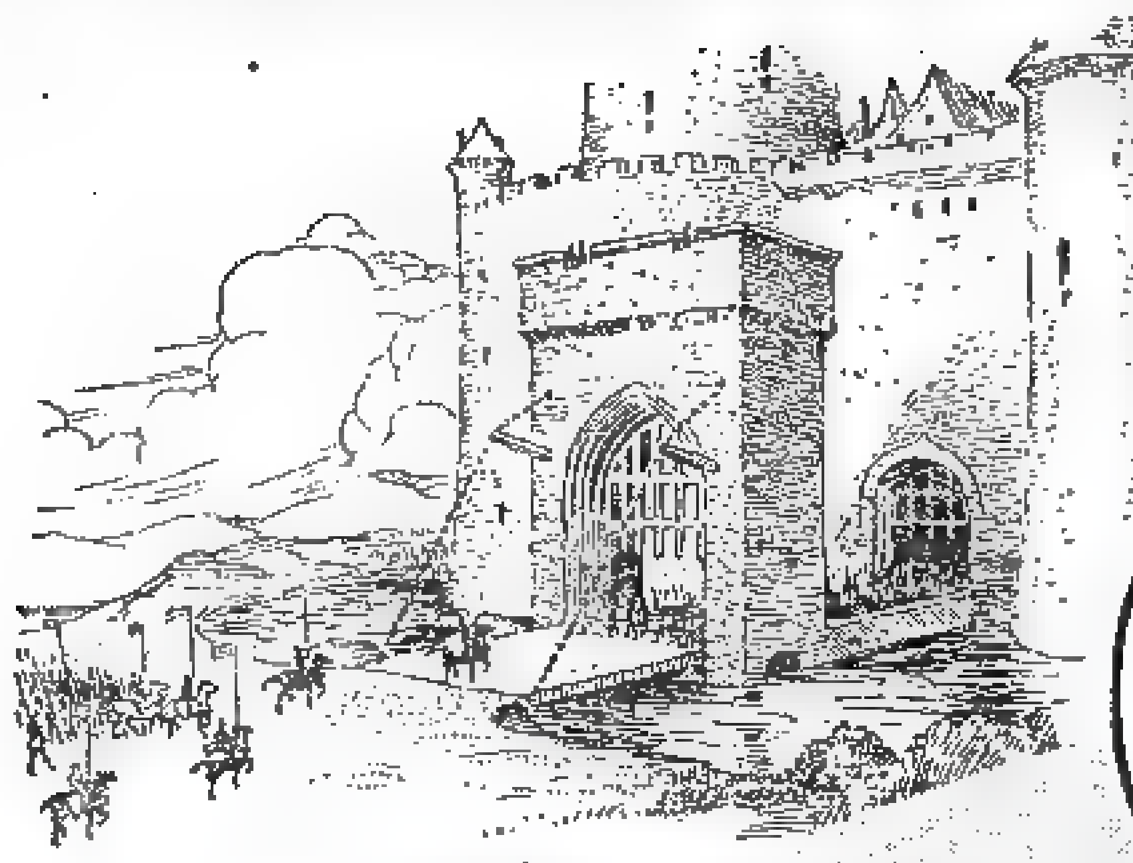


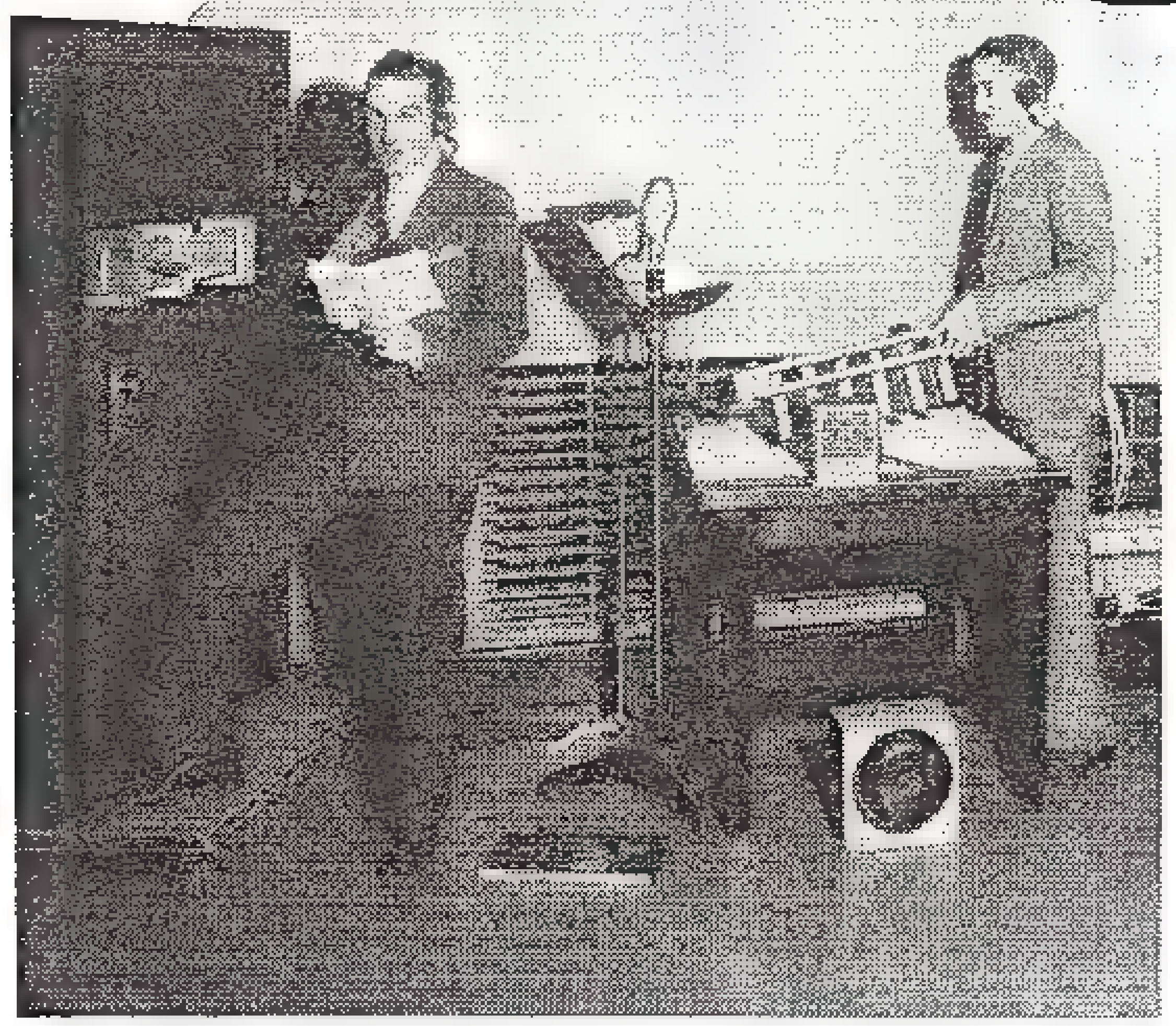


Train effect gadgets: Left to right, large drum for chugging; motor-driven wind machine; grindstone for sand brakes; snare drum, distant chugging; air tank, exhaust; toy train under cone, clicking wheels.

The process, unfortunately, is not quite that simple. Experience has taught sound technicians that the microphone, the ether and your receiving set do queer things to sounds. By the time the bubbling of the coffee pot reaches your ears the sound resembles the roar of the surf.

Hence Mr. Kelly and his assistants are not trying to fool you when they boil oil in the frying pan before the microphone and the actor remarks, "Ummmm, that coffee smells good." They have to fool the "mike."





For programs with a medieval background, equipment above is used. Box-like affair at left imitates sound of heavy door, with latch for drawing of door bolt. On the floor are chains for sound of raising drawbridge. Man at right imitates sound of soldiers marching over wooden drawbridge.

Modern Mechanix and Inventions Exclusive Photo

In the exclusive picture shown above, NBC artists demonstrate a scene from an air thriller—a head-splitting sequence. Note soundman about to bury hatchet in cabbage head. Circle left—Ray Kelly, technician, many of whose sound devices are described in accompanying text.

"Sounds don't sound as they sound," says Mr. Kelly. "To simulate a rap on a window, for instance, the obvious thing is to rap on window glass with the knuckles. But over the mike," explains Mr. Kelly, "it sounds too thin. We tried tapping a pencil on glass, but it was too metallic. We tapped slate, books, walls, doors, with knuckles, pencils and xylophone sticks. Finally, by accident, one of the soundmen hit the triple-ply glass that separates the control booth from the studio and the rap went over the mike. Perfect!"

When Amos 'n' Andy first went on the air with their OK Hotel, a real telephone switchboard was constructed for them at great expense. "It sounded like a house falling down when it came over the air in the rehearsal broadcasts," Mr. Kelly reveals. Hence you never heard it. The sound engineers went into a huddle and when they came out of it they brought with them an ordinary cigar box with a buzzer and dry cell battery on the inside. This was the buzz of the switchboard. Atop the cigar box was a closet latch which produced the noise of a cord plug being plugged into the switchboard. The whole contrivance cost less than a dollar.

The vibration sounds of the engines of a steamboat almost drove the engineers from their laboratory to sanitariums. But they finally emerged from what is probably the queerest laboratory in the world with a "dingus" to make a noise like the engine vibrations. It is very simple. A length of iron pipe is suspended from a support by a heavy spring. The pipe is given a tug and the tortional action of the spring comes over the ether as the vibrations of a steamboat engine.

Footsteps in the mud? Well, the "plumber's friend" proves to be the sound engineer's friend also. Working a sink plunger up and down in a box of wet bran

(Continued on page 118)

RIDING the SKYWAYS With Modern Barnstormers

by

WESTON FARMER

Yesterday the barnstormer flew his old Jenny from one cabbage patch to another, seeking scattered fares; today crowds throng airport ramps to ride his powerful tri-motor.

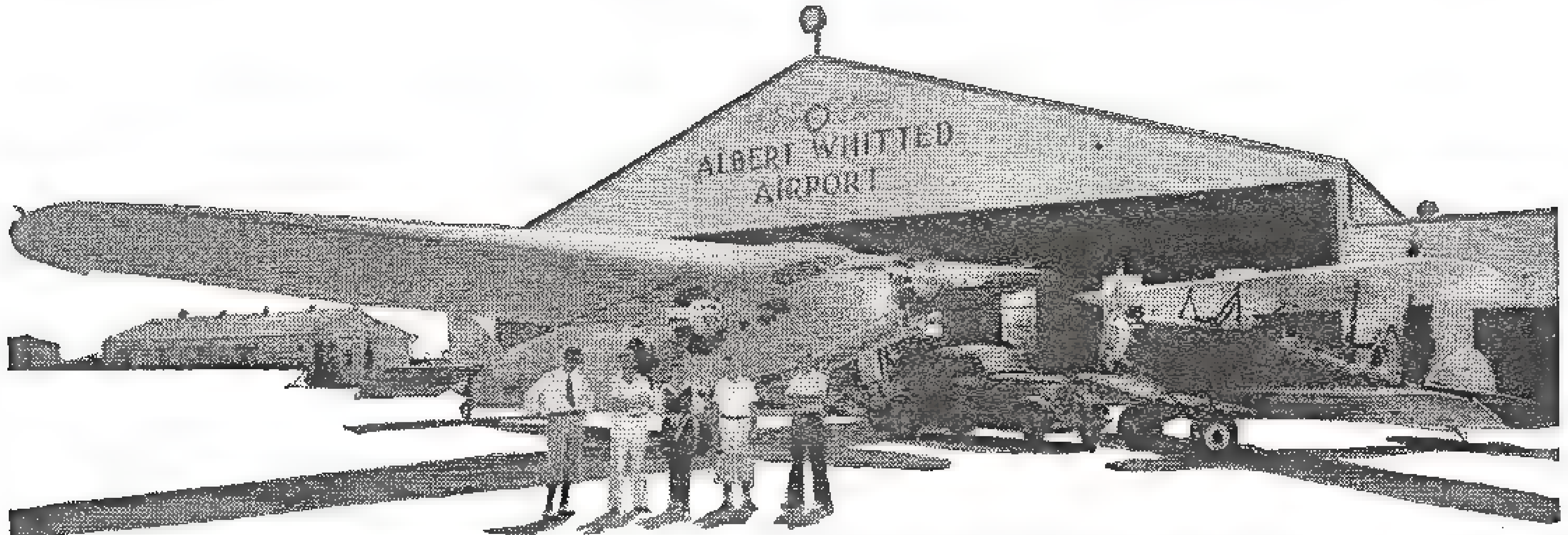


Photo shows a modern barnstorming troupe—Mel Swanson's tri-motor, the sound car and stunt plane, a Waco J-6. This all-star outfit is known at airports from coast to coast.

Mel Swanson's famous group of flying stars in the shadow of the tri-motor. Left to right: Billy Morgan, Paul De Weiss, Mel Swanson, Virginia Whittlesey and the late Jerry Wessling, killed making a delayed chute jump at Floyd Bennett field just before he was to have rejoined Swanson's flying troupe as a parachute jumper for the 1934 summer season.

STRIVING for points of vantage, the crowd masses against the guard rail at the airport. Quickening curiosity marks every face. An air of expectancy hangs over the field. Even the local pilots have shut off their motors. America's ace barnstorming outfit is going into action. Mel Swanson and his Flying Stars are playing the field.

High in the sky—10,000 feet up—a man suddenly bails out of an airplane. A streak of white trails him as he drops, hurtling toward the crowd at the airport ramp. On the field a tarpaulin has been spread for a landing target.

"I'll bet anybody in the crowd five bucks that he lands withing fifty feet of the tarp!" barks a man with a megaphone.

There are no takers. The crowd has learned from experience that Mel Swanson's parachute men are among the best in the business.

The daring stunt man hurtles earthward. At a thousand feet—maybe five hundred—he pulls the ripcord.

Snap! And the parachute whips to a mushroom.

Then he flies the chute in toward the mark, not knowing how many dollars his chief may have placed on him; but seldom has he failed to hit terra firma more than an arm's reach from the tarp.

The cheers of the crowd have scarcely died away when the plane from which the stunt artist has leaped suddenly goes stark wild, like a thing flown by a demon.

Screaming chandelles, loops over and under, everything in the book from Immelmans to whipstalls are performed with such rapidity that spectators wonder what sort of flying fiend is at the stick.

With a final screaming dive that grips the stomachs of the spectators, the ship comes into the field. It taxies to the line and out steps little Virginia Whittlesey, age 24, America's premier woman stunt pilot. She is another member of Swanson's all-star cast.

Tricks of the Barnstorming Trade

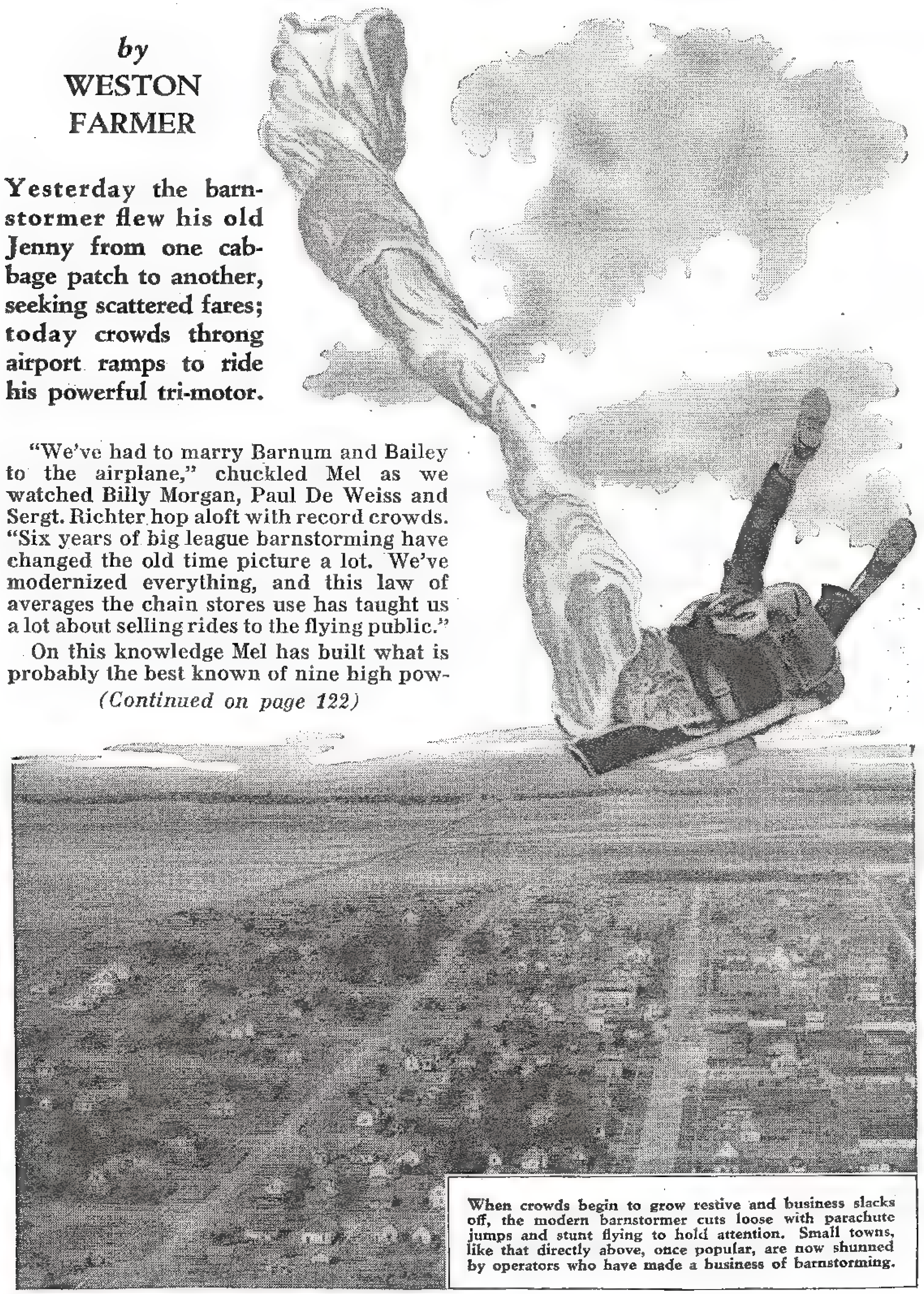
What is this, you ask—a major air show? The answer is "No, just part of the daily program with a modern barnstorming outfit." By means of stunts like these, coupled with a keen knowledge of crowd psychology and sales ballyhoo, Mel Swanson, premier barnstormer, has built up a record of having flown more than 310,000 people—a greater number than any other man in the world. The stunts are a necessary part of Swanson's program.

The barnstorming business has changed since the old days when pilots hedgehopped from one cabbage patch to another in antiquated Jennies, hoping to pick up an occasional five dollar bill. Delayed parachute leaps, autogyro stunting, aerial acrobatics and unbelievably large and interested crowds—these form the modern barnstorming picture in which chain store methods have capitalized the human urge to fly.

"We've had to marry Barnum and Bailey to the airplane," chuckled Mel as we watched Billy Morgan, Paul De Weiss and Sergt. Richter hop aloft with record crowds. "Six years of big league barnstorming have changed the old time picture a lot. We've modernized everything, and this law of averages the chain stores use has taught us a lot about selling rides to the flying public."

On this knowledge Mel has built what is probably the best known of nine high pow-

(Continued on page 122)



When crowds begin to grow restive and business slacks off, the modern barnstormer cuts loose with parachute jumps and stunt flying to hold attention. Small towns, like that directly above, once popular, are now shunned by operators who have made a business of barnstorming.

SPORTSMEN'S

For Thrilling SPORT Start a SKEET CLUB

by CAPT. W. H. FAWCETT

Noted Publisher, Sportsman, Manager and Member of 1924 Champion American Olympic Trapshooting Team

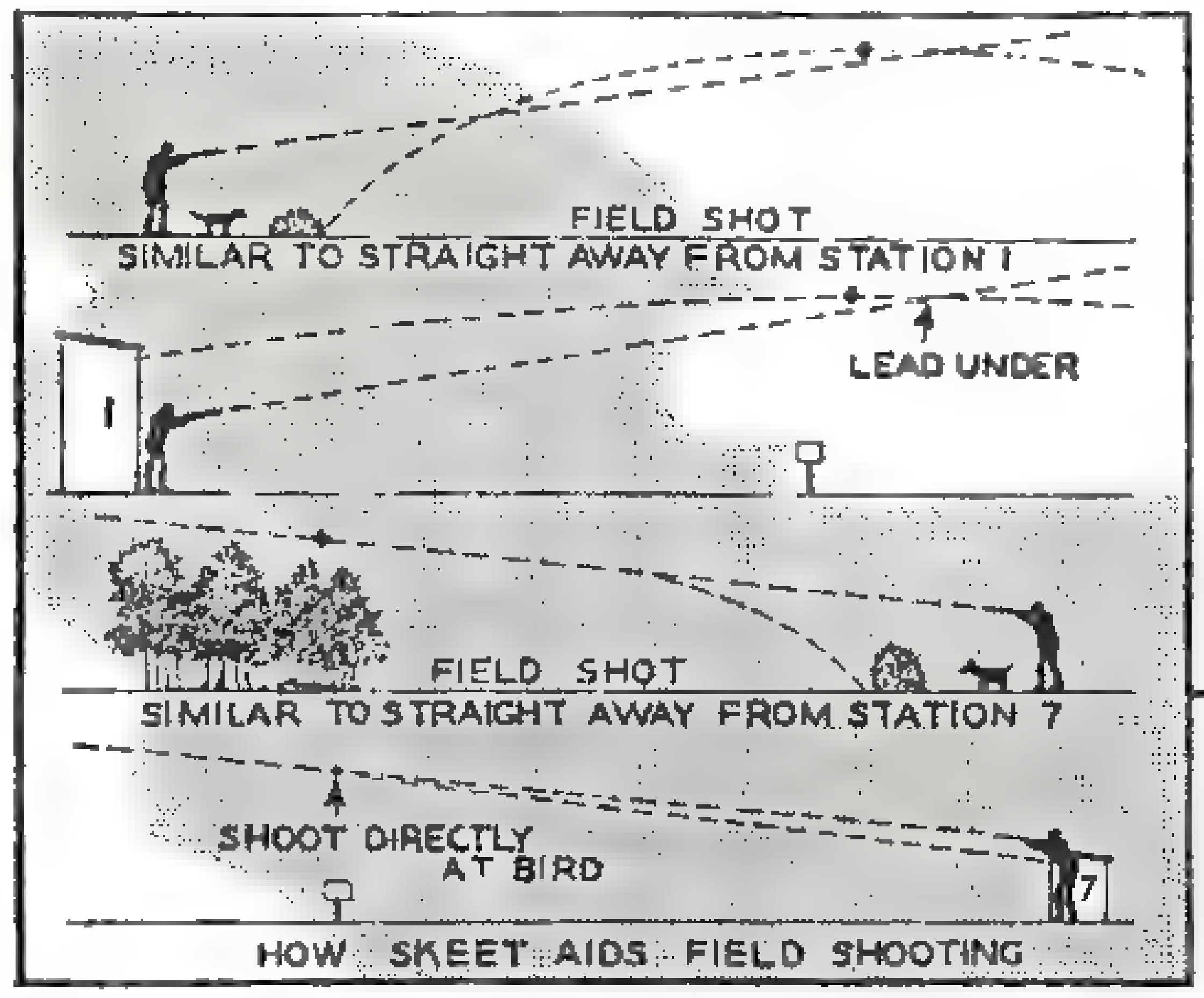
Lay out a skeet field and try this fascinating shooting game. You will forget golf, bridge, and meals attempting to chalk up a better score. Here are good pointers from an outstanding leader in the sport.

THE history of the new national sport of skeet is a record of amazing progress. From its inception in 1920 on the grounds of the Glen Rock Kennels in Andover, Mass., clubs have sprung up all over the United States. Today, one will find skeet being shot even in the smallest of hamlets.

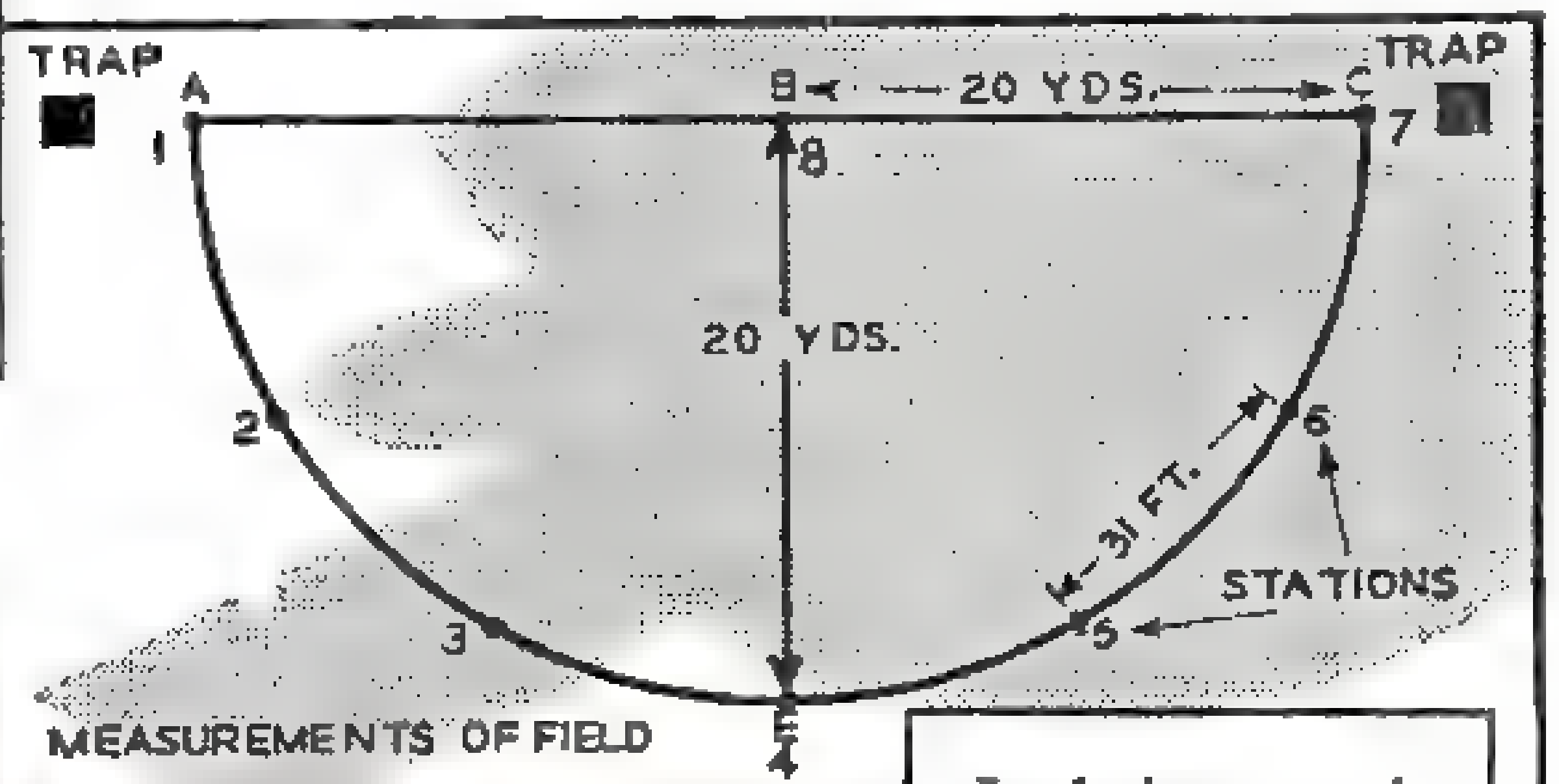
Skeet, which gets its name from an old Scandinavian form of the word "shoot," has already gone far beyond its sponsors' expectations. There are several reasons for this, mainly, because the average hunter wanted some form of wing shooting to test his skill and, incidentally, afford practice during the off months when he, or she, wasn't allowed by law to hunt game. The factor of chance and ego also play a large part in the popularity of this new and exciting sport.

We glean from the Official Skeet Rule and Handbook published by the National Skeet Shooting Association, Inc., of Boston, Mass., the following interesting facts.

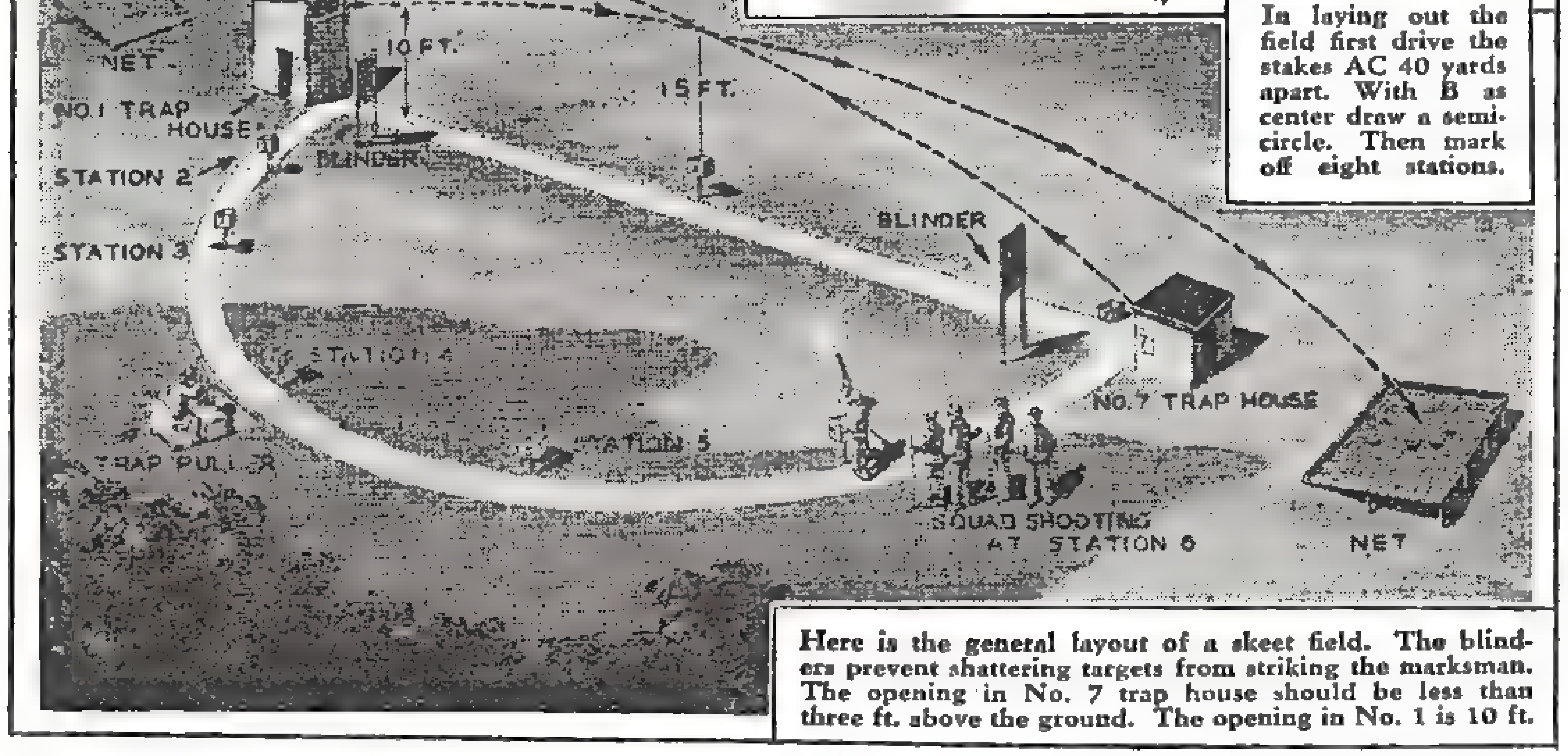
Safety is the first and greatest consideration when choosing a skeet field. Therefore, a liberal allowance should be granted for the range of the guns. It is estimated that the danger zone measures 300x600 yards so that your field should be considerably larger than this area.


FIELD SHOT
SIMILAR TO STRAIGHT AWAY FROM STATION 1
LEAD UNDER
FIELD SHOT
SIMILAR TO STRAIGHT AWAY FROM STATION 7
SHOOT DIRECTLY AT BIRD
HOW SKEET AIDS FIELD SHOOTING

Skeet will improve your marksmanship. The speed and angle of targets resemble field conditions.


TRAP
A
1
B
20 YDS.
C
TRAP
7
8
20 YDS.
2
6
31 FT.
STATIONS
3
5
4
MEASUREMENTS OF FIELD

In laying out the field first drive the stakes AC 40 yards apart. With B as center draw a semicircle. Then mark off eight stations.


NET
NO.1 TRAP HOUSE
10 FT.
15 FT.
BLINDER
STATION 2
STATION 3
STATION 4
BLINDER
NO.7 TRAP HOUSE
STATION 5
TRAP PULLER
SQUAD SHOOTING AT STATION 6
NET

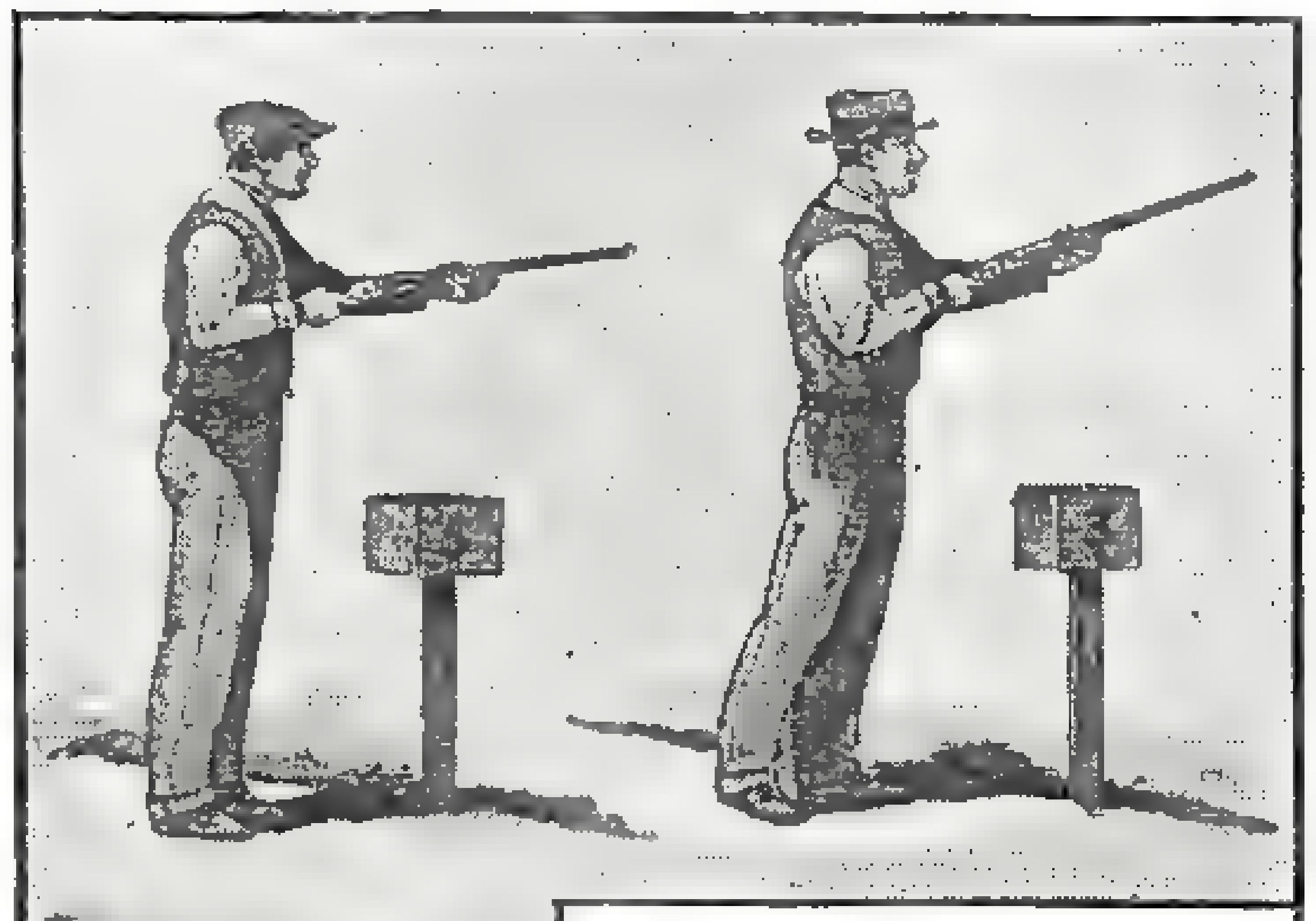
Here is the general layout of a skeet field. The blinders prevent shattering targets from striking the marksman. The opening in No. 7 trap house should be less than three ft. above the ground. The opening in No. 1 is 10 ft.

Laying Out the Skeet Field

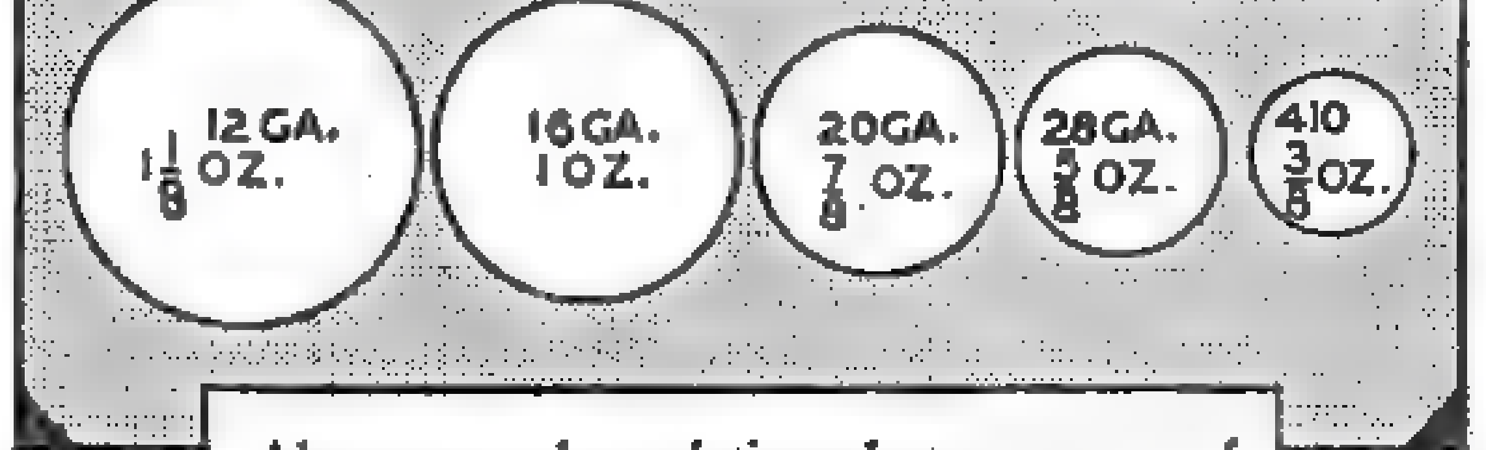
A skeet target, similar to those thrown in the companion sport of trapshooting, is smaller and, consequently, harder to hit than a game bird flying at equal speed. For this reason, it is advisable to have a clear sky background.

In laying out the field, drive two stakes 40 yards apart, as shown in diagram labeled AC. The line that connects these stakes should run northwest by southwest as, ordinarily, the light is better when shooting toward the northeast. Stake B should be

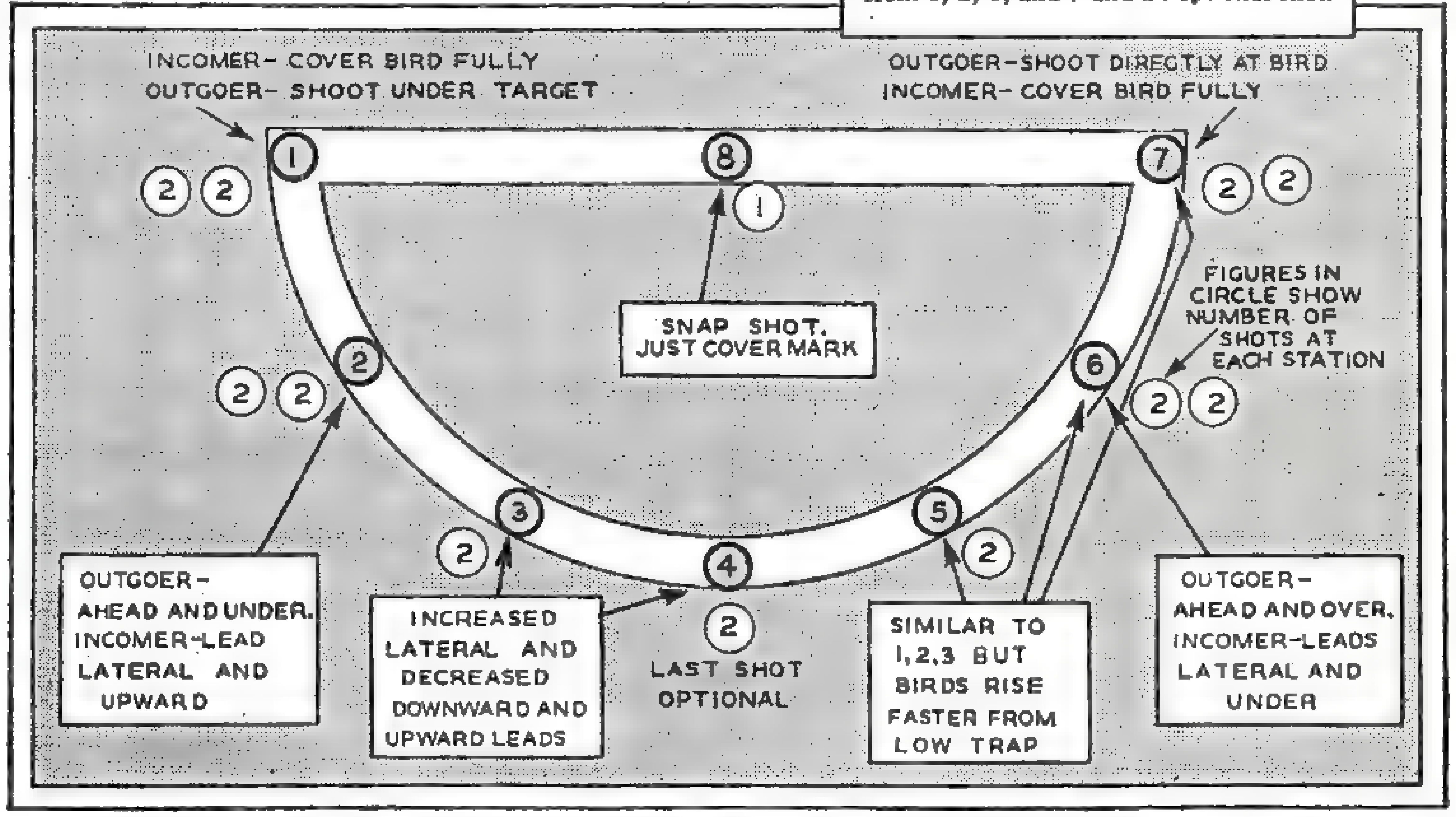
(Continued on page 130)

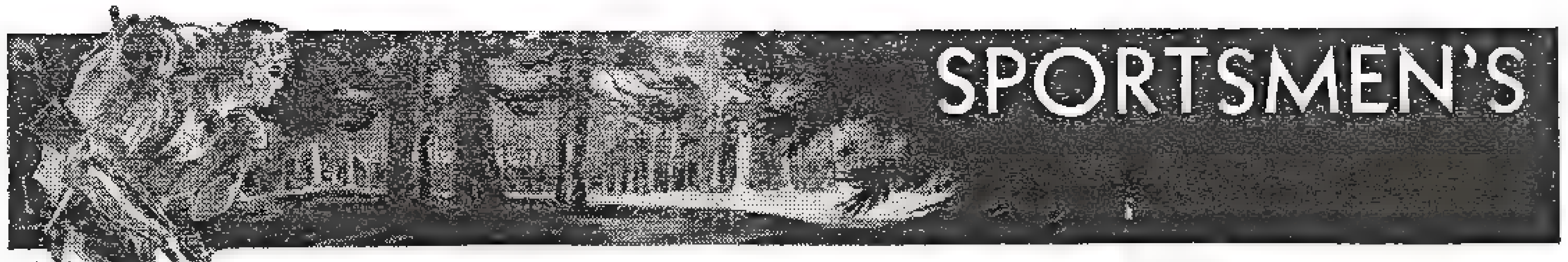


Above two good skeet positions are shown. Don't lean over on your stock, but stand with the shoulders leaning forward. Keep head in vertical position.

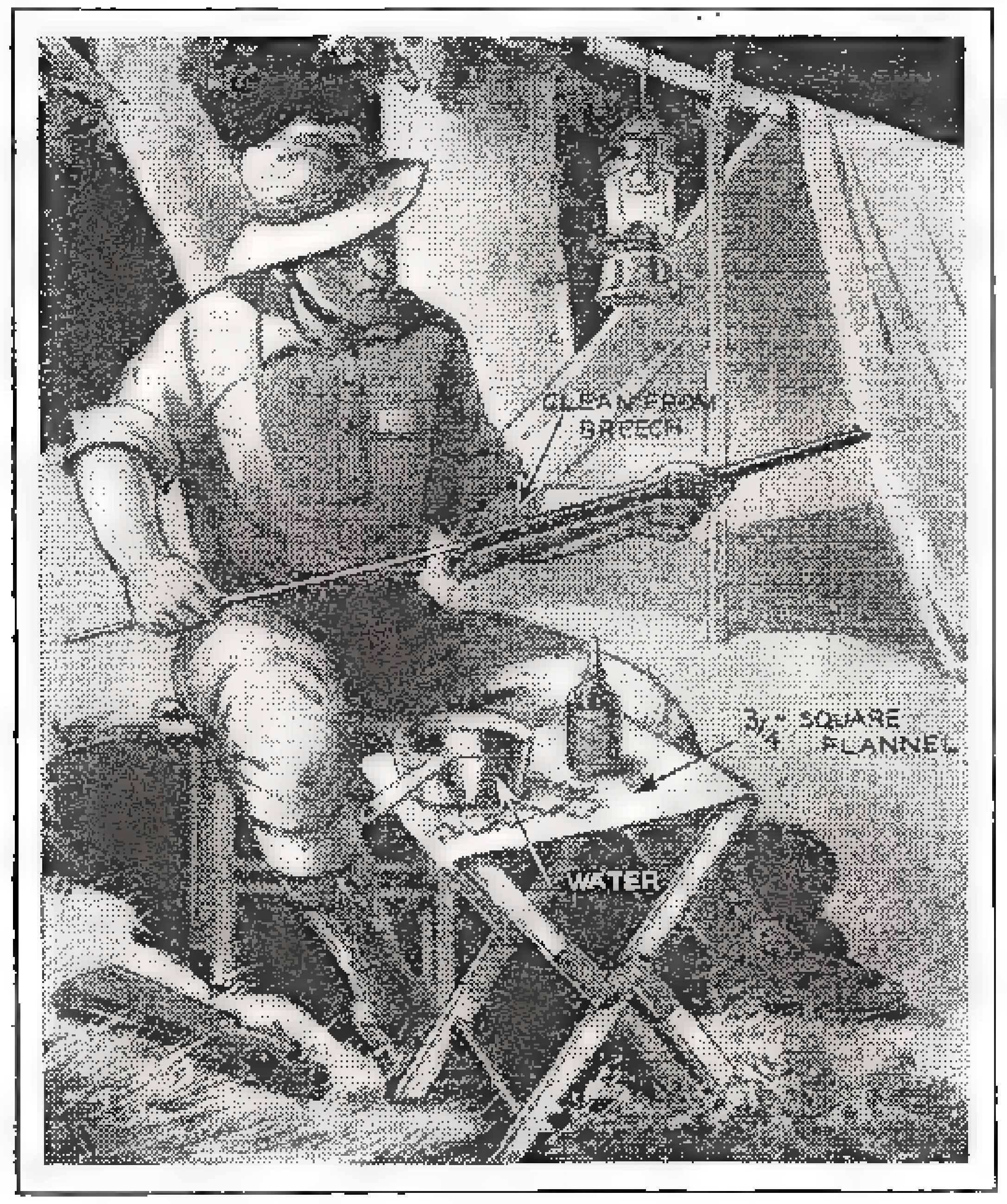

$1\frac{1}{8}$ OZ. 12 GA.
16 GA. 1 OZ.
20 GA. $\frac{7}{8}$ OZ.
28 GA. $\frac{3}{8}$ OZ.
410 $\frac{3}{8}$ OZ.

Above are the relative shot patterns of different gauge guns. Proper leads are given below. Two singles are first shot from 8 stations, then 4 sets of doubles from 1, 2, 6, and 7 and an optional shot.


INCOMER– COVER BIRD FULLY
OUTGOER– SHOOT UNDER TARGET
OUTGOER–SHOOT DIRECTLY AT BIRD
INCOMER– COVER BIRD FULLY
1
8
7
2 2
1
2 2
SNAP SHOT. JUST COVER MARK
FIGURES IN CIRCLE SHOW NUMBER OF SHOTS AT EACH STATION
2
6
2 2
2 2
3
5
4
2
2
2
OUTGOER– AHEAD AND UNDER. INCOMER–LEAD LATERAL AND UPWARD
INCREASED LATERAL AND DECREASED DOWNWARD AND UPWARD LEADS
LAST SHOT OPTIONAL
SIMILAR TO 1,2,3 BUT BIRDS RISE FASTER FROM LOW TRAP
OUTGOER– AHEAD AND OVER. INCOMER–LEADS LATERAL AND UNDER



Advantages of .22 Rifles for Hunting



If possible clean rifle from breech as shown here. Run water soaked flannels through first, then dry and follow with oiled flannels. Grease gun until ready to be used.

by ROBERT PAGE LINCOLN

THE .22 caliber rifle in its many patterns and makes is one of the most popular guns in North America. All other makes of guns in the world could not begin to come up to the total number of these popular small bore rifles now in use.

Undoubtedly when the .22 caliber rifle was first made in this country it was considered as fitted for the boy only. However, its popularity grew rapidly among adult hunters as well as boy hunters. As a result the gun makers set about perfecting the gun and the demand for the .22 increased. Today we have guns in this class that are far more accurate and powerful than the .22 of the past.

At the present time the .22 brass cartridge case has been perfected to the point where a pressure of upwards of 24,000 pounds to the square inch may be exerted. The .22 long rifle cartridge, loaded with modern smokeless powder, has a muzzle velocity of well over 1000 feet per second, and will carry up to 1400 yards. This cartridge is accurate up to 200 yards and close in the bullet will go through five pine boards.

There are three varieties of .22 cartridge, the Short, the Long and the Long Rifle. The .22 Short cartridge is the one most consistently in use. Since it is accurate up to 25 yards or more it is ideal for squirrels, rabbits and other game that may be shot within comparatively close range. It is more nearly the kind of ammunition the boy should use, especially in well settled sections. At that, the extreme, uninterrupted range of the .22 Short is 1000 yards.

It has been stated that .22 Long is likely to become obsolete, with the Long Rifle taking its place. The .22 Long Rifle cartridge is used extensively in target work. It is considered one of the best vermin cartridges, especially when hollow point bullets are used. Many men in the woods are using the hollow point .22 L. R. cartridge in killing deer, a practice that is not to be commended, although if a vital spot is reached this bullet will down a deer with ease. The trouble with using the .22 on big game is that it often cruelly wounds the animal, leaving him to suffer for days.

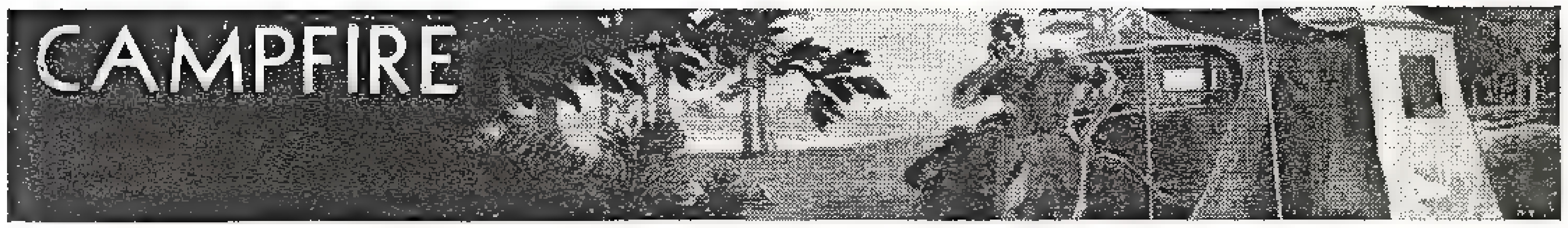
Greased or Greaseless Bullets?

Shoot the kind of shell your gun calls for. It should be understood that these guns are chambered to take the .22 Short, the .22 Long or the .22 Long Rifle cartridge, and as they are chambered, for that one cartridge and that only they should be used. To attempt to use the wrong cartridge may lead to damaging the rifling and injuring the accuracy of the rifle.

Whether greased or greaseless bullets are best to use in the .22 is a subject of contention. Some claim the greased bullet prolongs the life of the barrel because of the grease protection. This may be true, but the practice of dumping greased bullets into hunting coat pockets, there to gather dirt, dust and lint, and then shoving them into the gun uncleaned, is certainly far from beneficial. As opposed to this the dry, ungreased shells may be kept in the pocket without encountering such conditions.

To properly clean your rifle use the new water method. Run a flannel patch that has

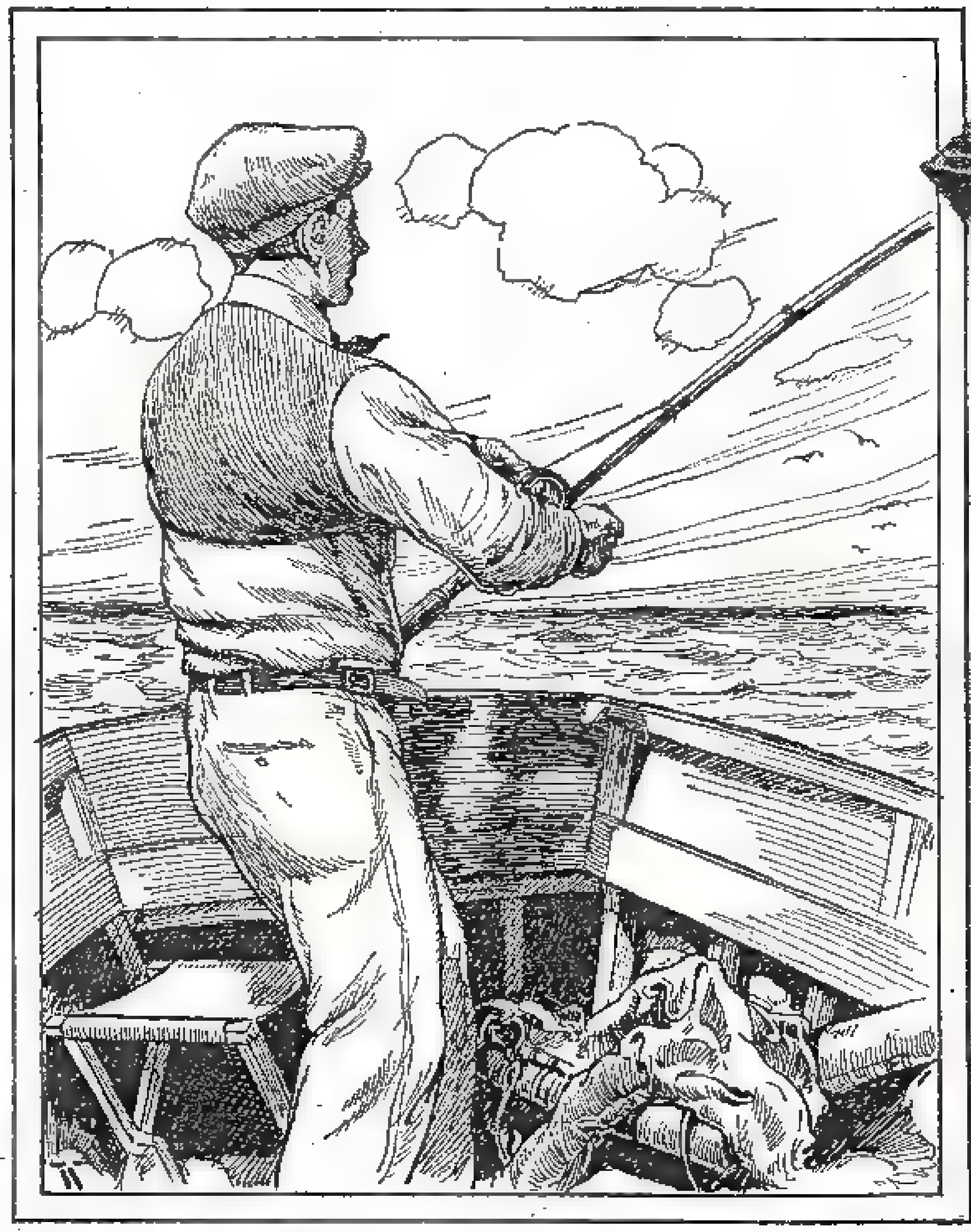
(Continued on page 127)



Try a Small Boat for Big Fish

For real fishing thrills wrestle swordfish and sea bass from an outboard motor boat.

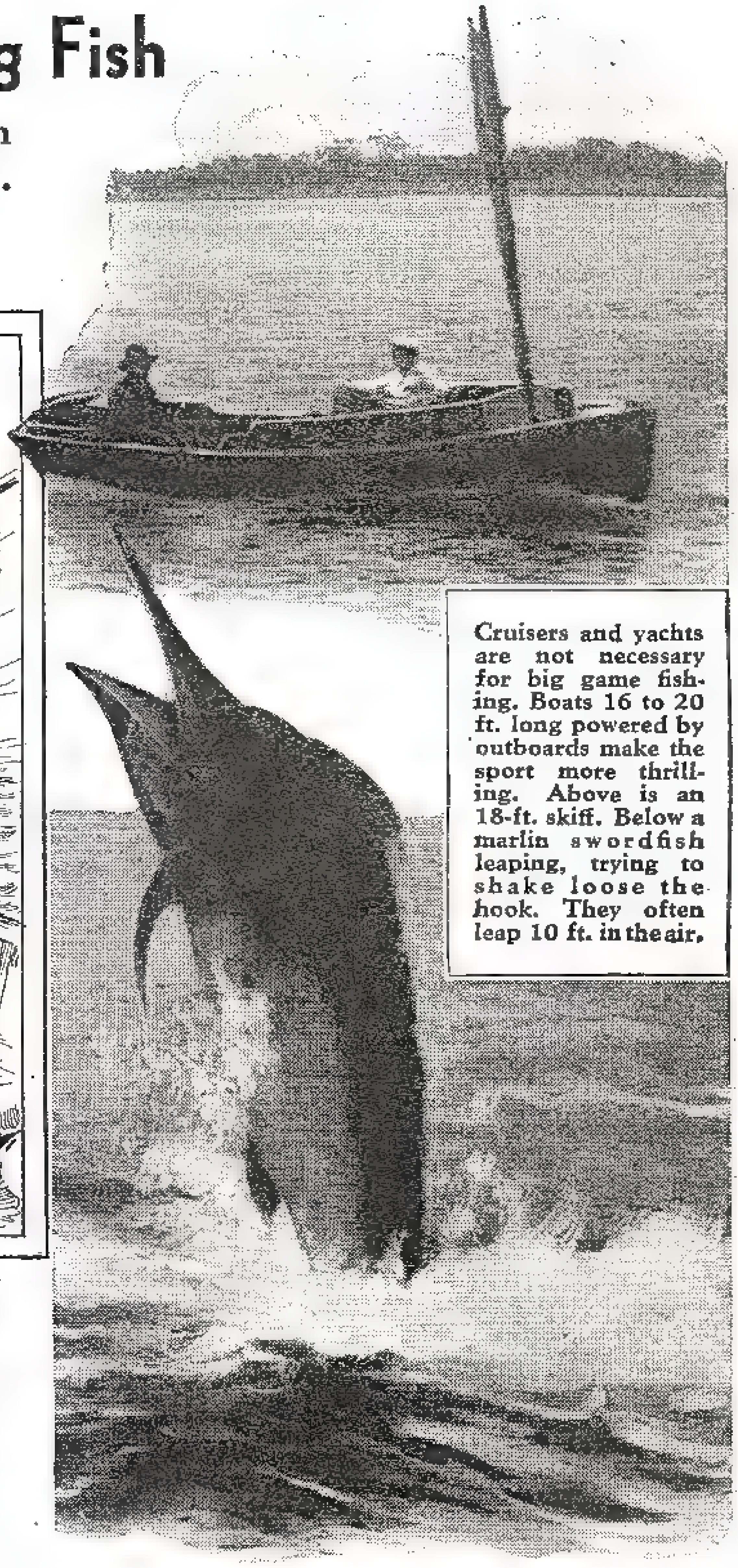
by PAUL W. GARTNER



When the sea giant strikes, a battle, often lasting hours, begins. Some anglers take 150-lb. fish on six-ounce rods.

A SICKLE-LIKE fin knifes through the bounding surface of the ocean. Experienced eyes identify a marlin swordfish, the prince of big game fishes. A small boat, powered by an outboard motor, cautiously circles the finned giant, as he lazily cruises about the sun-warmed surface. Two eager fishermen drop their baits to troll them across the path of the marlin. But will the sea titan strike?

Breathless moments, and the long shadow of purple and silver darts toward one of the skittering baits. He grabs the lure and whirls away, as the free spool of the angler's reel quickly and silently rips off line. Tensed and excited, the man can hardly resist the temptation to strike, but he knows he must wait until the game has swallowed the bait fish.



Cruisers and yachts are not necessary for big game fishing. Boats 16 to 20 ft. long powered by outboards make the sport more thrilling. Above is an 18-ft. skiff. Below a marlin swordfish leaping, trying to shake loose the hook. They often leap 10 ft. in the air.

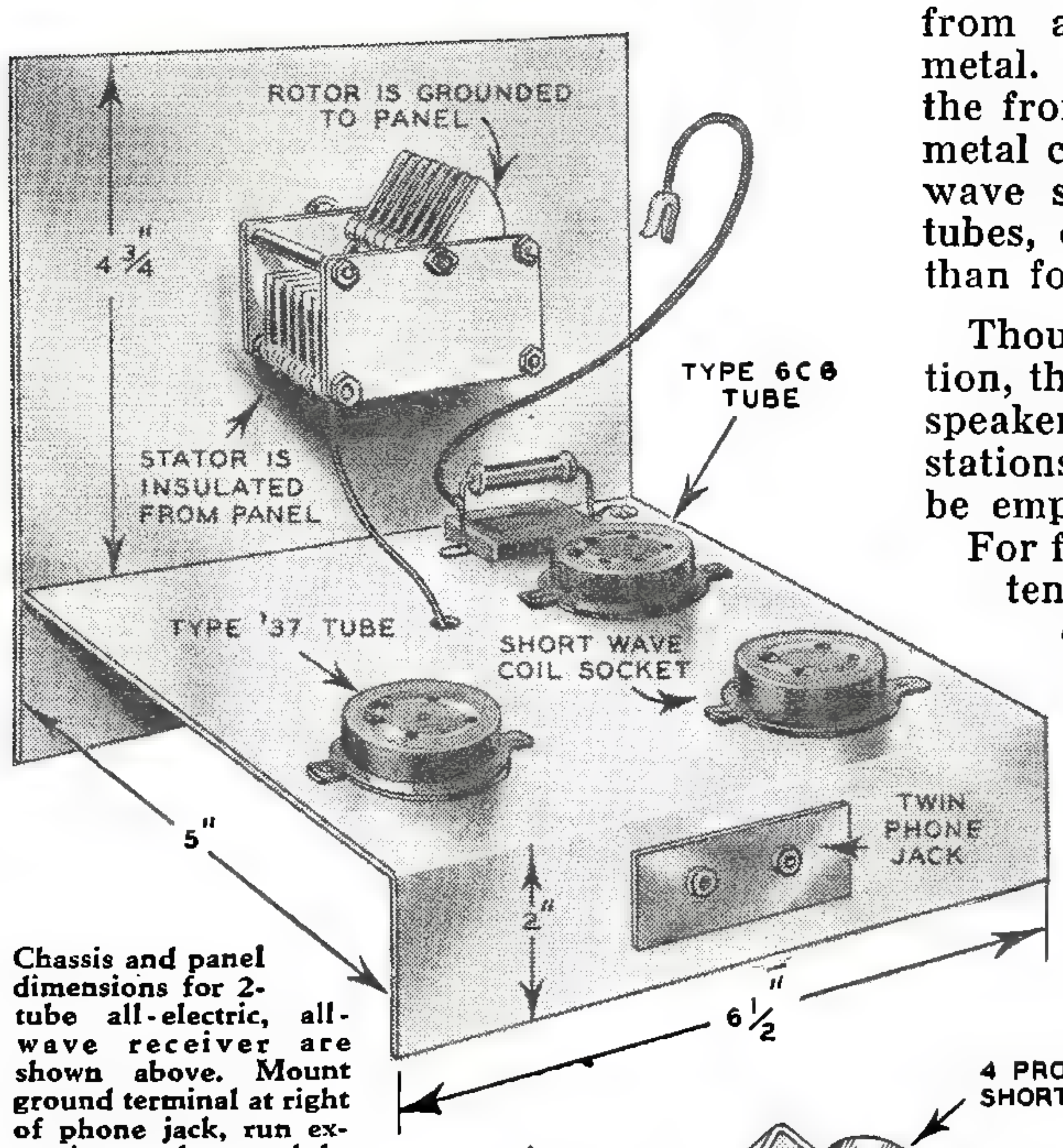
Now the marlin pauses, but in a second opens up with a terrific run. The stout rod whips upward, and for an instant there is severe tension on rod and line. The battle has begun. A dozen times the marlin rises vibrantly above the rolling blue, while the angler realizes a thrill which many claim is unexcelled in any other field of sport.

Such is big game fishing as it is practiced from small craft in southern California waters. Swordfishing is no longer a sport to be

(Continued on page 127)

Two Tube All-Wave Radio Plugs Into LIGHT SOCKET

By using the new triple-function 6C6 tube, foreign reception with headphones, local programs on the loudspeaker are obtained with this compact two-tube all-electric long and short wave receiver.


ROTOR IS GROUNDED TO PANEL
4 3/4"
STATOR IS INSULATED FROM PANEL
TYPE 6C6 TUBE
TYPE '37 TUBE
SHORT WAVE COIL SOCKET
TWIN PHONE JACK
5"
2"
6 1/2"

Chassis and panel dimensions for 2-tube all-electric, all-wave receiver are shown above. Mount ground terminal at right of phone jack, run extension cord out at left.

IN ADDITION to bringing in broadcast entertainment, this compact two tube all-electric receiver provides the thrills of foreign short wave reception. It will work anywhere where 100 to 120 volt power, either alternating or direct current, is available.

The set is built up on a metal chassis cut from aluminum or any available sheet metal. The metal front panel also serves as the front of the ornamental crackle finish metal cabinet used so extensively by short wave set builders. The entire set, with tubes, coils, and headphones, weighs less than four pounds.

Though designed for headphone operation, this set will operate a small magnetic speaker very nicely on the powerful local stations. Two or more sets of phones may be employed at the same time if desired.

For foreign reception a good outdoor antenna with one of the commercial noise-eliminating lead-in systems is recommended, but for local broadcasts even a short indoor aerial will prove satisfactory.

The circuit is beautifully simple. Only two tubes are used, one of these, the type '37, with plate and grid tied together, serving only as a rectifier.

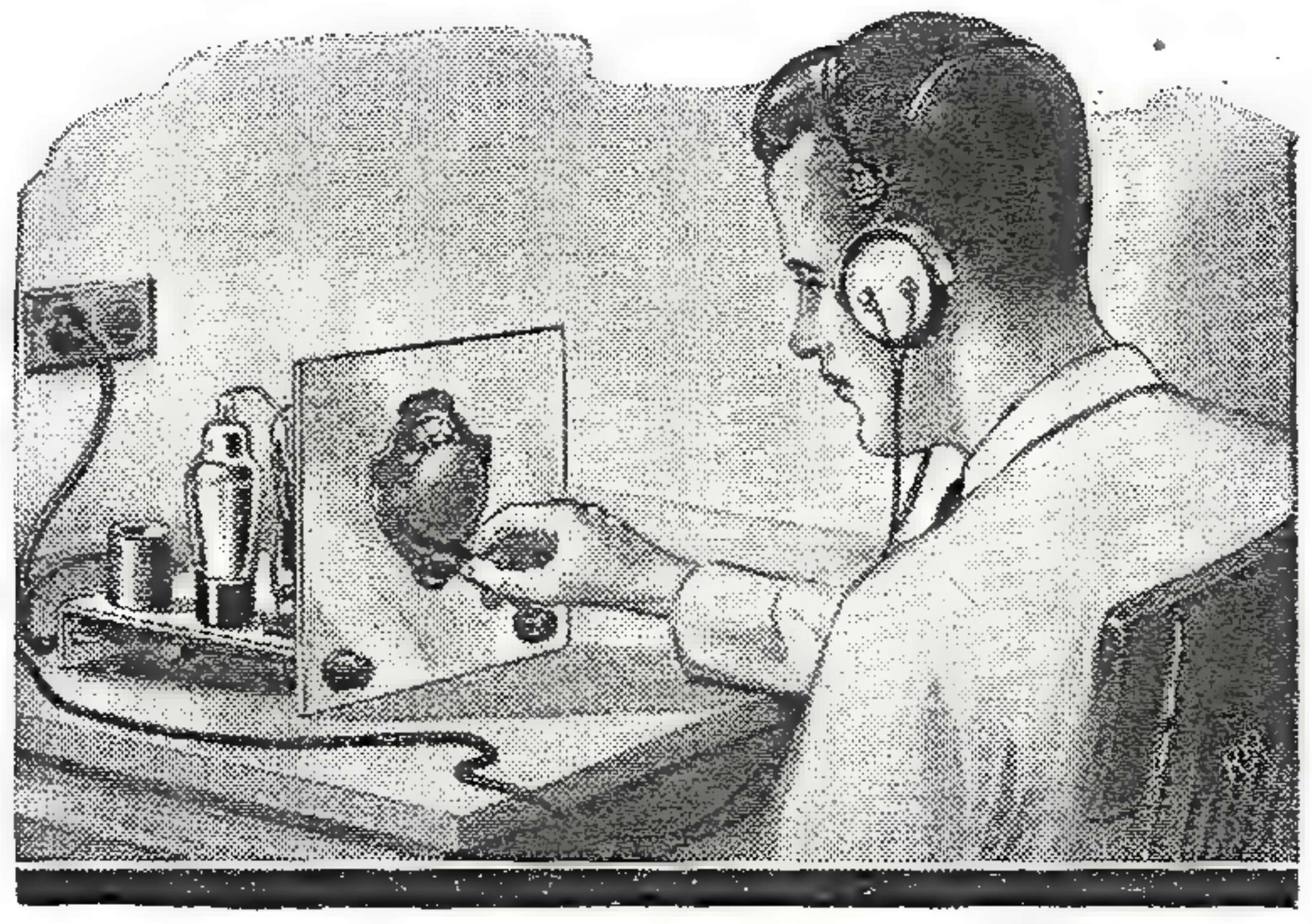
The new 6C6 tube used in this set actually does the work of three ordinary radio tubes, picking up the radio frequency signals, detecting them, then furnishing the audio frequencies for the headphone.

Naturally, regeneration is used to make the set as sensitive and selective as possible. A potentiometer shunted across the tickler winding of the plug-in coil serves as regeneration control.

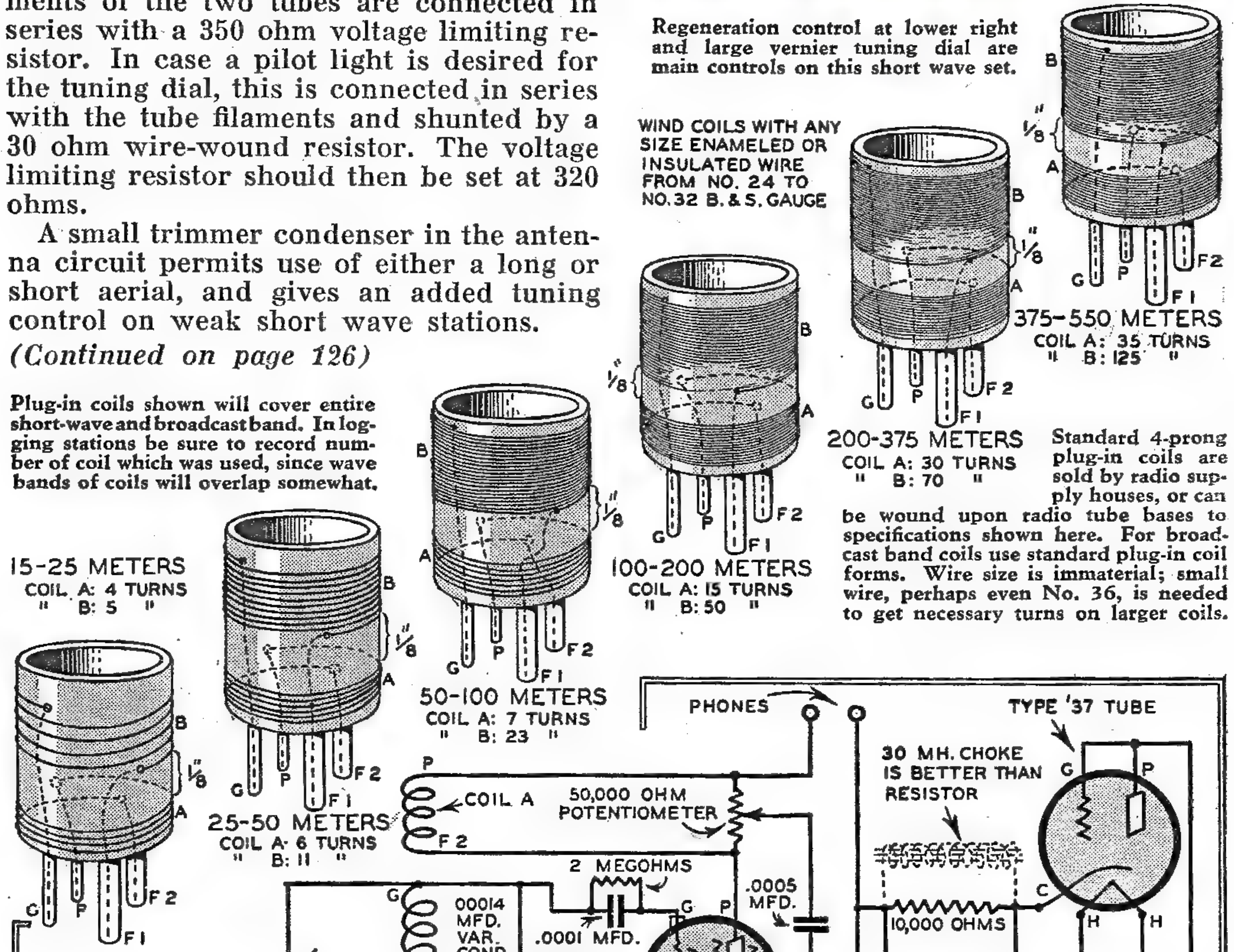
The Cisin Universal A.C.—D.C. circuit permits this set to be used interchangeably on alternating or direct current. The filaments of the two tubes are connected in series with a 350 ohm voltage limiting resistor. In case a pilot light is desired for the tuning dial, this is connected in series with the tube filaments and shunted by a 30 ohm wire-wound resistor. The voltage limiting resistor should then be set at 320 ohms.

A small trimmer condenser in the antenna circuit permits use of either a long or short aerial, and gives an added tuning control on weak short wave stations.

(Continued on page 126)

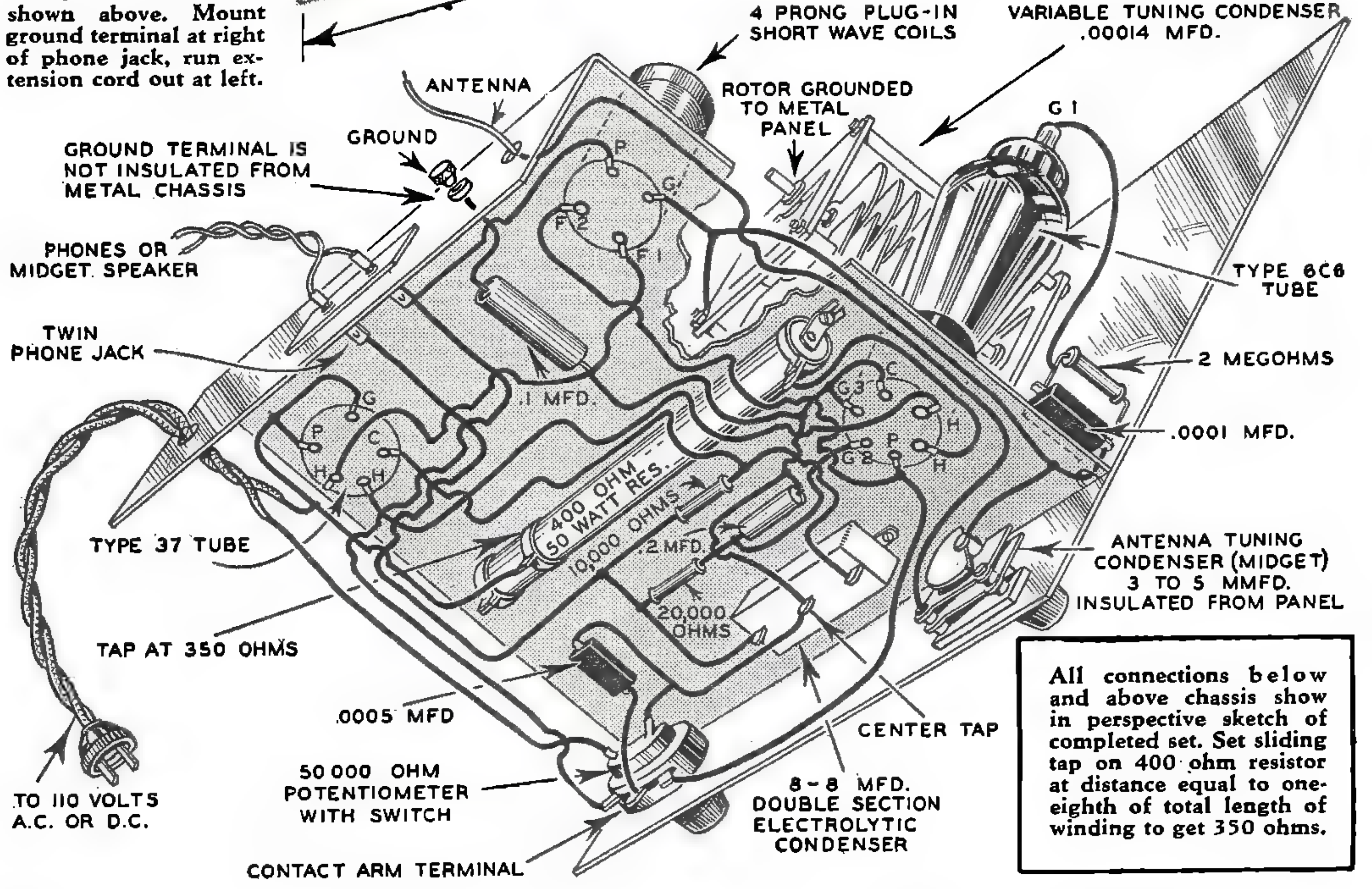


Regeneration control at lower right and large vernier tuning dial are main controls on this short wave set.

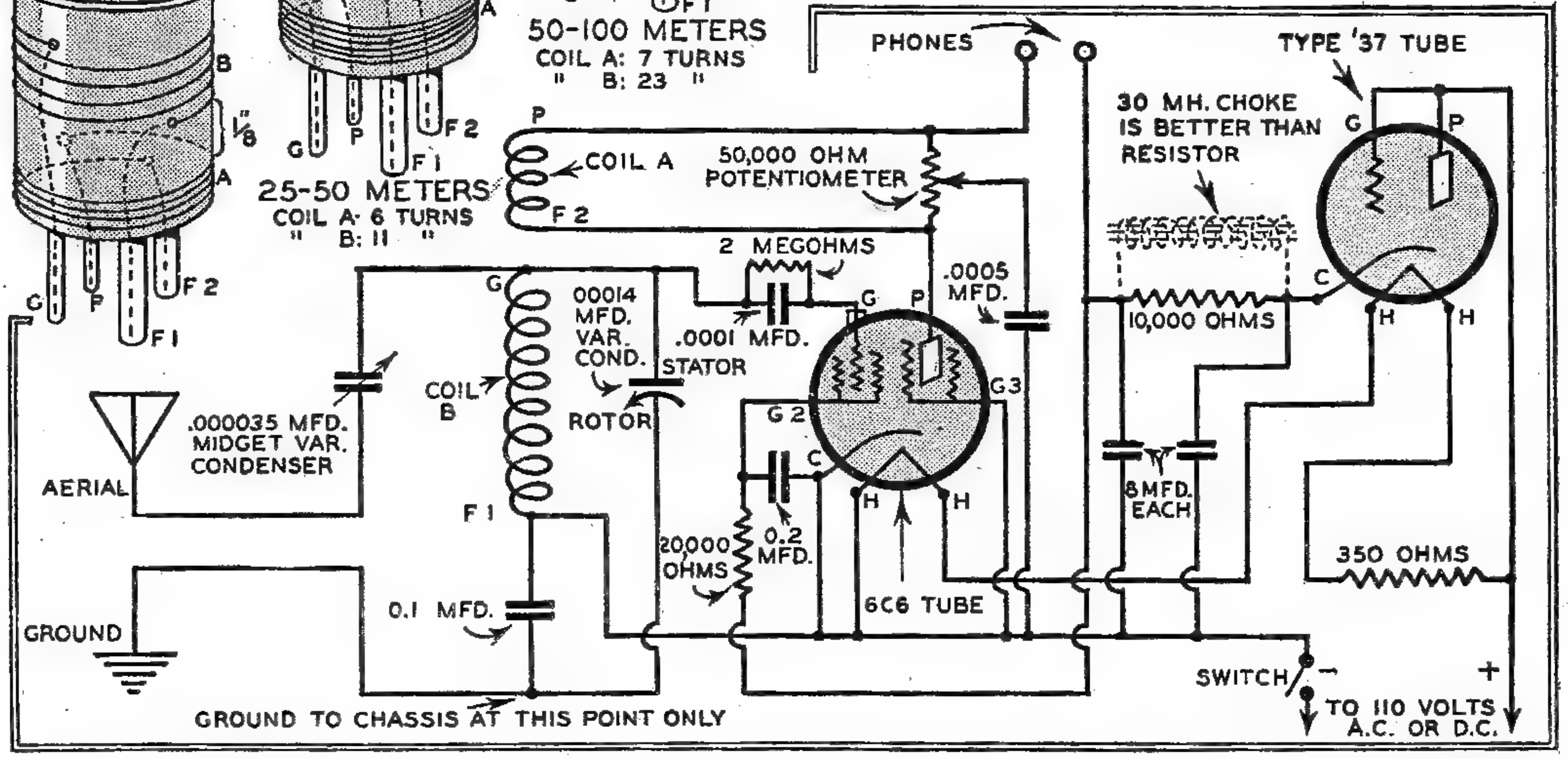

WIND COILS WITH ANY SIZE ENAMELED OR INSULATED WIRE FROM NO. 24 TO NO. 32 B. & S. GAUGE
375-550 METERS
COIL A: 35 TURNS
" B: 125 "
200-375 METERS
COIL A: 30 TURNS
" B: 70 "
100-200 METERS
COIL A: 15 TURNS
" B: 50 "
50-100 METERS
COIL A: 7 TURNS
" B: 23 "
25-50 METERS
COIL A: 6 TURNS
" B: 11 "
15-25 METERS
COIL A: 4 TURNS
" B: 5 "
A
B
1/8"
G
P
F1
F2

Plug-in coils shown will cover entire short-wave and broadcast band. In logging stations be sure to record number of coil which was used, since wave bands of coils will overlap somewhat.

Standard 4-prong plug-in coils are sold by radio supply houses, or can be wound upon radio tube bases to specifications shown here. For broadcast band coils use standard plug-in coil forms. Wire size is immaterial; small wire, perhaps even No. 36, is needed to get necessary turns on larger coils.


4 PRONG PLUG-IN SHORT WAVE COILS
VARIABLE TUNING CONDENSER .00014 MFD.
ANTENNA
GROUND
ROTOR GROUNDED TO METAL PANEL
G1
GROUND TERMINAL IS NOT INSULATED FROM METAL CHASSIS
PHONES OR MIDGET SPEAKER
TWIN PHONE JACK
TYPE 6C6 TUBE
2 MEGOHMS
.0001 MFD.
.1 MFD.
400 OHM 50 WATT RES.
10,000 OHMS
.2 MFD.
20,000 OHMS
TYPE 37 TUBE
ANTENNA TUNING CONDENSER (MIDGET) 3 TO 5 MMFD. INSULATED FROM PANEL
TAP AT 350 OHMS
.0005 MFD
CENTER TAP
50 000 OHM POTENTIOMETER WITH SWITCH
8-8 MFD. DOUBLE SECTION ELECTROLYTIC CONDENSER
TO 110 VOLTS A.C. OR D.C.
CONTACT ARM TERMINAL
P
G
C
H
F1
F2
G2
G3

All connections below and above chassis show in perspective sketch of completed set. Set sliding tap on 400 ohm resistor at distance equal to one-eighth of total length of winding to get 350 ohms.


PHONES
TYPE '37 TUBE
P
COIL A
F 2
50,000 OHM POTENTIOMETER
30 MH. CHOKE IS BETTER THAN RESISTOR
2 MEGOHMS
.0005 MFD.
G
00014 MFD. VAR. COND.
.0001 MFD.
STATOR
10,000 OHMS
COIL B
ROTOR
G 3
G 2
C
H
.000035 MFD. MIDGET VAR. CONDENSER
AERIAL
8 MFD. EACH
F 1
20,000 OHMS
0.2 MFD.
350 OHMS
GROUND
0.1 MFD.
6C6 TUBE
SWITCH
TO 110 VOLTS A.C. OR D.C.
GROUND TO CHASSIS AT THIS POINT ONLY

Schematic circuit diagram of set is shown here for those who prefer to plan their own arrangement of parts. Filter resistor of 10,000 ohms may be replaced by standard filter choke if a.c. hum comes through phones. In tuning set, locate station with tuning dial, then adjust regeneration potentiometer until set is just ready to break into regeneration squeal. Antenna condenser need be tuned only for weak short wave stations. Note that set wiring is grounded to chassis at one point only.

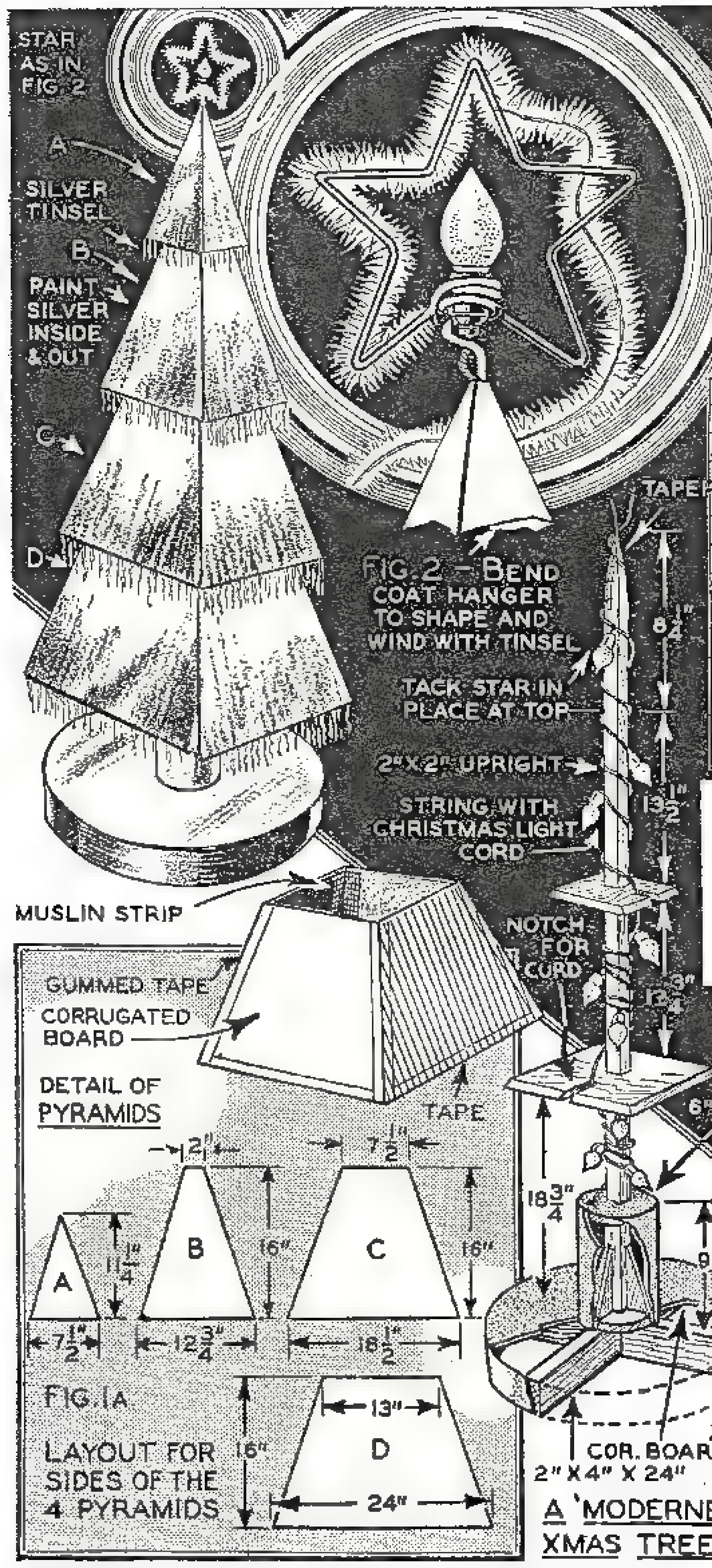
Christmas LIGHTING *Effects for the* MODERN HOME

Electrically lighted Yuletide decorations in "moderne" design add a gala holiday aspect to the exterior of any home. The novel effects portrayed here are easily made in the home workshop at little expense.

by DAVID A. BROWN

CHRISTMAS FLOODLIGHTING

BIRCH TREES around the house stand out best when illuminated with red floodlights.
BLUE SPRUCE trees require blue floodlighting.
EVERGREENS of other varieties stand out with either red or blue illumination.
HOME itself uses lights same color as walls.


STAR AS IN FIG. 2
A
SILVER TINSEL
B
PAINT SILVER INSIDE & OUT
C
D
FIG. 2 — BEND COAT HANGER TO SHAPE AND WIND WITH TINSEL
TAPER
8¼"
TACK STAR IN PLACE AT TOP
2"X2" UPRIGHT
13½"
STRING WITH CHRISTMAS LIGHT CORD
MUSLIN STRIP
NOTCH FOR CORD
12¾"
GUMMED TAPE
CORRUGATED BOARD
DETAIL OF PYRAMIDS
TAPE
6" DI.
2"
7½"
A
11¼"
B
16"
C
16"
7½"
12¾"
18½"
18¾"
9"
FIG. 1A
LAYOUT FOR SIDES OF THE 4 PYRAMIDS
16"
13"
D
24"
COR. BOARD
2" X 4" X 24"
A 'MODERNE' XMAS TREE

Concealed lights of different colors illuminate silvered pyramids of "moderne" Christmas tree, construction of which is shown above. Frame of tinsel star is coat hanger.

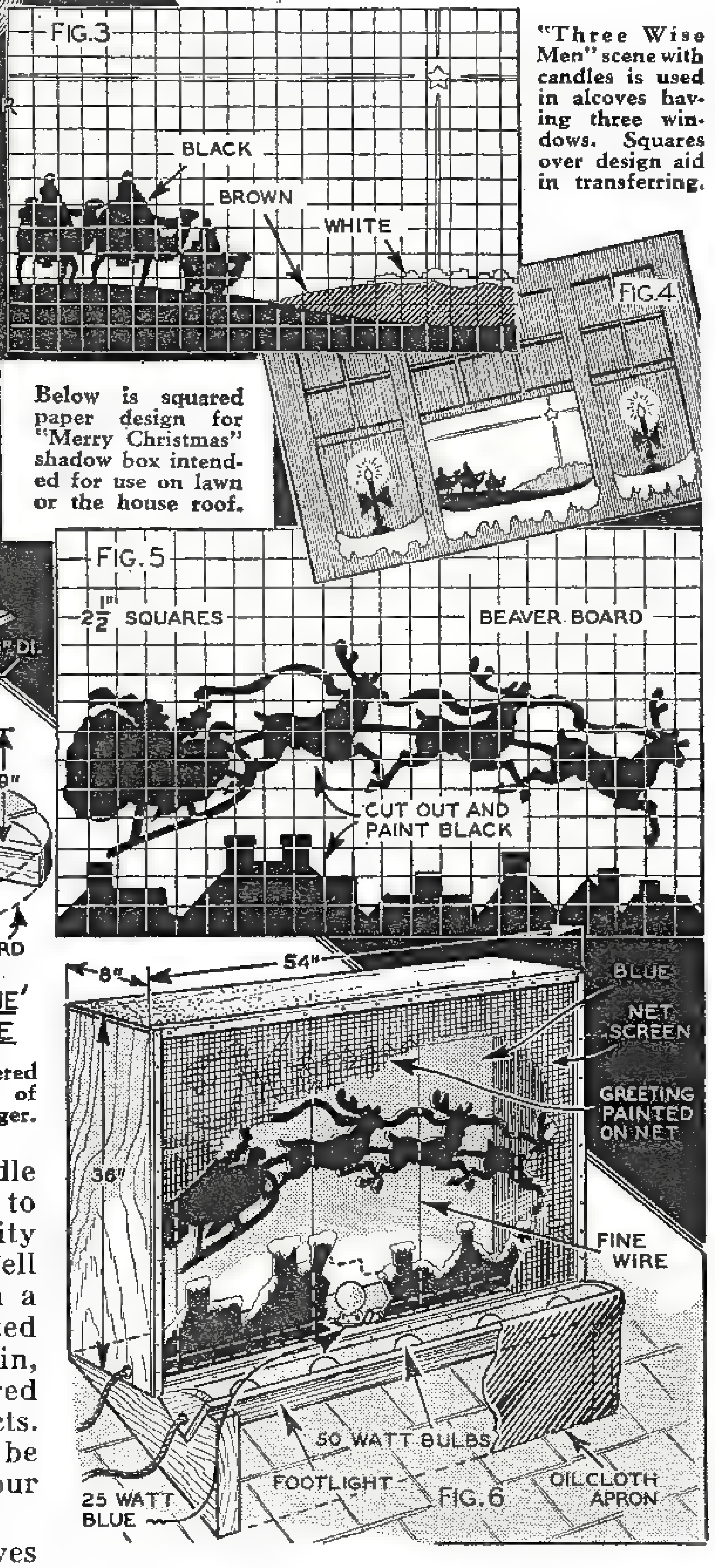
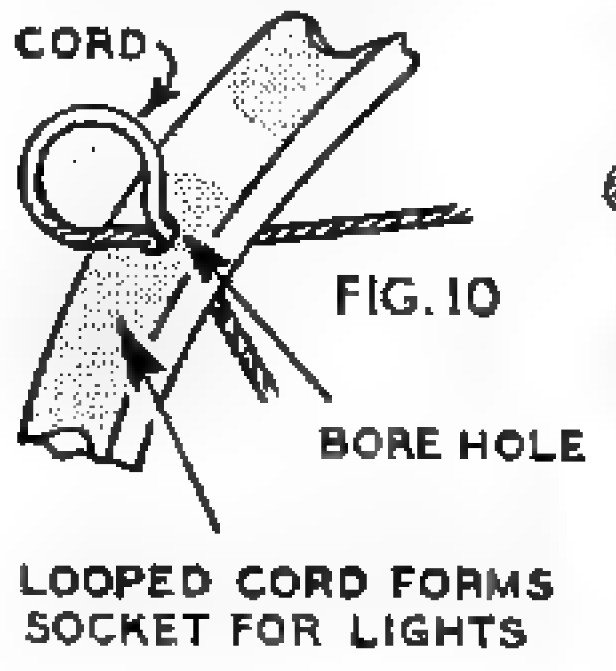


FIG. 3
BLACK
BROWN
WHITE
FIG. 4
FIG. 5
2½" SQUARES
BEAVER BOARD
CUT OUT AND PAINT BLACK
8"
54"
36"
BLUE
NET SCREEN
GREETING PAINTED ON NET
FINE WIRE
50 WATT BULBS
FOOTLIGHT
FIG. 6
OILCLOTH APRON
25 WATT BLUE

"Three Wise Men" scene with candles is used in alcoves having three windows. Squares over design aid in transferring.

Below is squared paper design for "Merry Christmas" shadow box intended for use on lawn or the house roof.

Illustration at right shows how to make "treeless" Xmas tree by using only a ten-foot mast and strings of lights, to be used in a dark corner of your lawn.


CORD
FIG. 10
BORE HOLE
LOOPED CORD FORMS SOCKET FOR LIGHTS

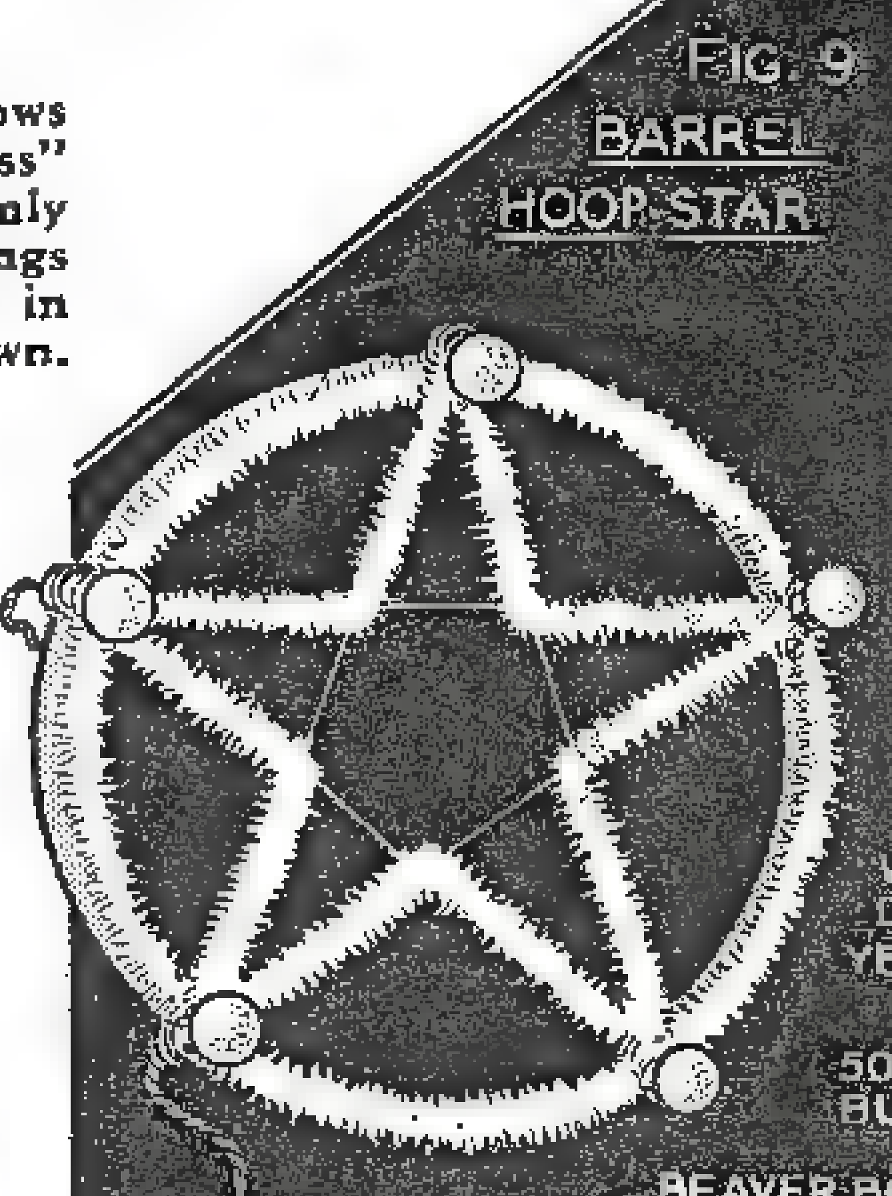


FIG. 9
BARREL HOOP STAR

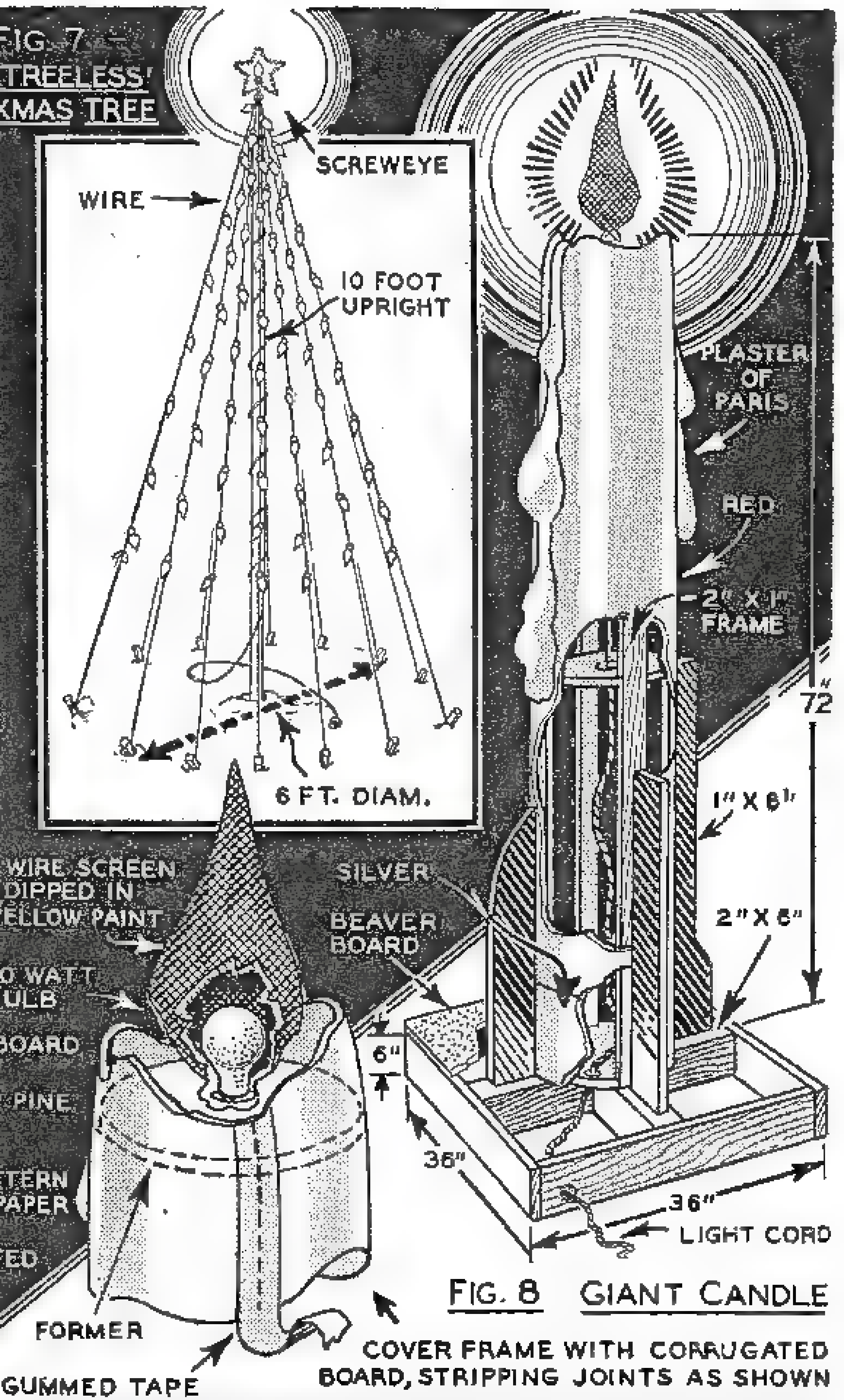
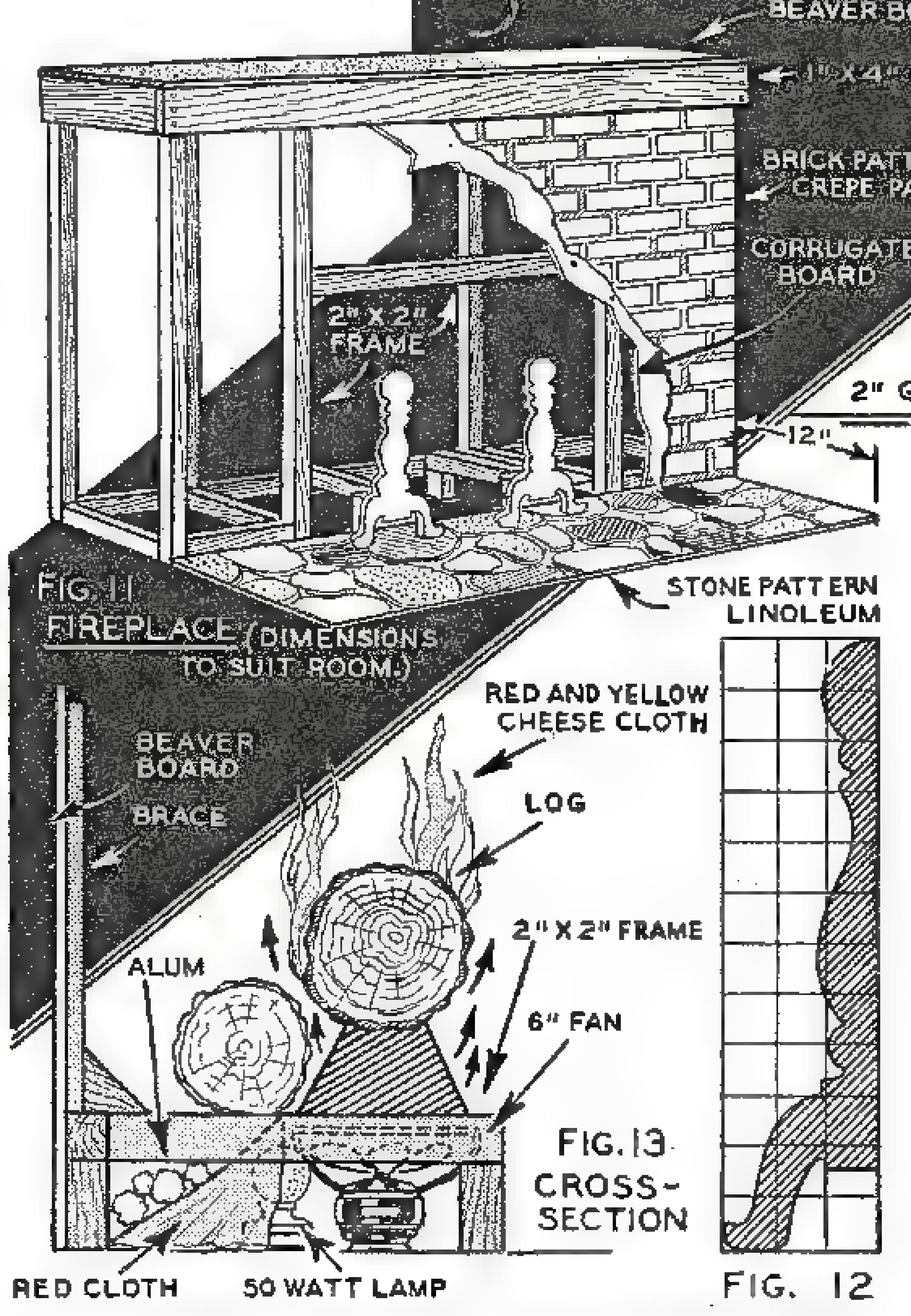


FIG. 7 — 'TREELESS' XMAS TREE
SCREWEYE
WIRE
10 FOOT UPRIGHT
6 FT. DIAM.
PLASTER OF PARIS
RED
2" X 1" FRAME
72"
1" X 8"
2" X 6"
SILVER
BEAVER BOARD
WIRE SCREEN DIPPED IN YELLOW PAINT
50 WATT BULB
6"
36"
36"
LIGHT CORD
FORMER
2" GUMMED TAPE
COVER FRAME WITH CORRUGATED BOARD, STRIPPING JOINTS AS SHOWN
FIG. 8 GIANT CANDLE

Giant candles are to be set on each side of doorway or gate. Screen dipped in yellow paint gives effect of candle flame.


BEAVER BOARD
1" X 4" PINE
BRICK PATTERN CREPE PAPER
CORRUGATED BOARD
2" X 2" FRAME
12"
STONE PATTERN LINOLEUM
FIG. 11 FIREPLACE (DIMENSIONS TO SUIT ROOM.)
BEAVER BOARD
BRACE
RED AND YELLOW CHEESE CLOTH
LOG
2" X 2" FRAME
6" FAN
ALUM
FIG. 13 CROSS-SECTION
RED CLOTH
50 WATT LAMP
FIG. 12

Realistic fireplace with flickering flames is readily built up from light-weight materials. Cover with brick design crepe paper. Pattern for half-section of andiron is shown at right.

OUR Forefathers placed a lighted candle in the window on Christmas Eve to flicker a Yuletide message of hospitality to wayfarers, but the custom gradually fell into disuse. Recently it was revived in a more modern form, the electrically lighted candle. The custom is gaining favor again, and in some communities prizes are offered for the most elaborate and novel effects. Here are a few suggestions which may be followed indoors as well as outdoors in your effort to brighten the holiday season.

A lighted Christmas scene, Fig. 6, gives a startling and novel effect when used on the porch roof or lawn. A shadow box is constructed of light material 4′ 6″ x 3′ x 8″. The back is Beaver Board painted navy blue. Lay out Santa and the reindeer and the house tops on another sheet of Beaver Board about 4′ 6″ x 3′, marking it into the same number of squares as Fig. 5. Using the intersecting lines as guides draw the outlines, then cut out and paint black. Tack the house tops to wooden cleats nailed in place two inches back of the front edge of the box. The other group is fastened with strips of adhesive tape on the back to four fine wires stretched from top to bottom just back of the house tops. Tufts of cotton placed along the edges of the roofs give the effect of snow. Three 25-watt blue lights behind these figures will silhouette them

(Continued on page 123)

How to START Your Car in BELOW-ZERO Weather

by L. J. MARKUS

Below-zero temperatures reduce the power of your car battery and at the same time make the engine far harder to start. Try these kinks the next time your engine is too cold and stiff to start.

WINTER brings a multitude of troubles to the auto owner, the most annoying of which is undoubtedly the starting of a car which has stood outside or in a cold garage overnight.

Ether has been injected into the combustion chamber of engines for years to aid in igniting the gasoline. With modern cars, where it is difficult to get liquid ether into the engine, soak a sponge or cloth with ether and hold over the air intake of the carburetor while someone is turning over the engine. The fumes will be drawn through the carburetor into the engine, where they mix with the gasoline.

The old saying about prevention being better than cure very aptly applies to the car. By keeping the engine just warm enough overnight to prevent oil from congealing, there will be no cold-morning starting troubles.

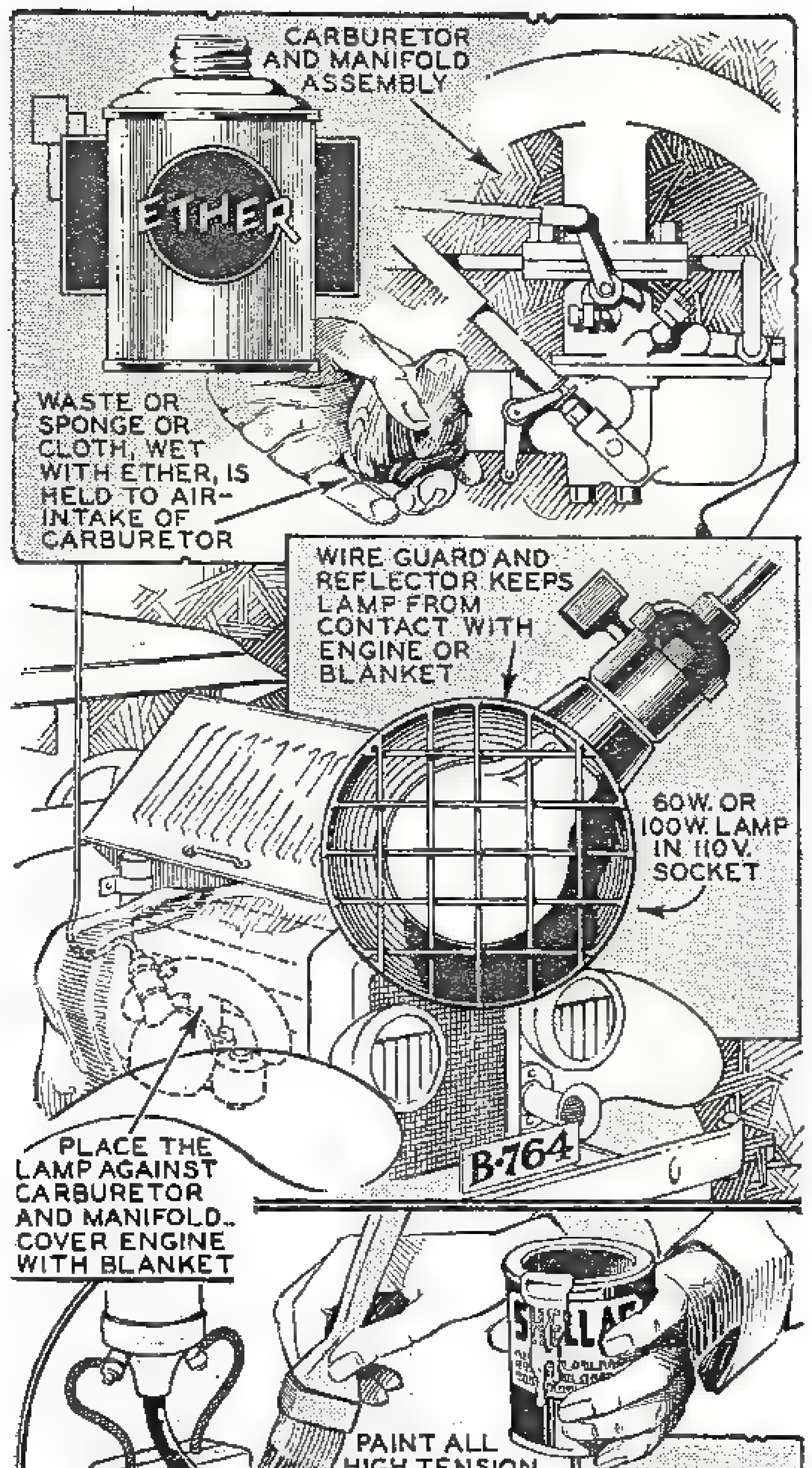
A 100 watt bulb placed against the carburetor and left burning through the night will not consume more than five cents worth of electricity, yet will keep the engine warm. The regular garage extension light with a wire guard is covered over with old blankets or sacks, to keep the heat in as much as possible. Be careful that no inflammable material touches the bulb itself. This method is generally used only when the temperature gets down to around 20° below.

Snow seeping in over the engine will often cause leakage of current from the high tension wires. This can be prevented by shellacking all ignition wires, making them doubly waterproof.

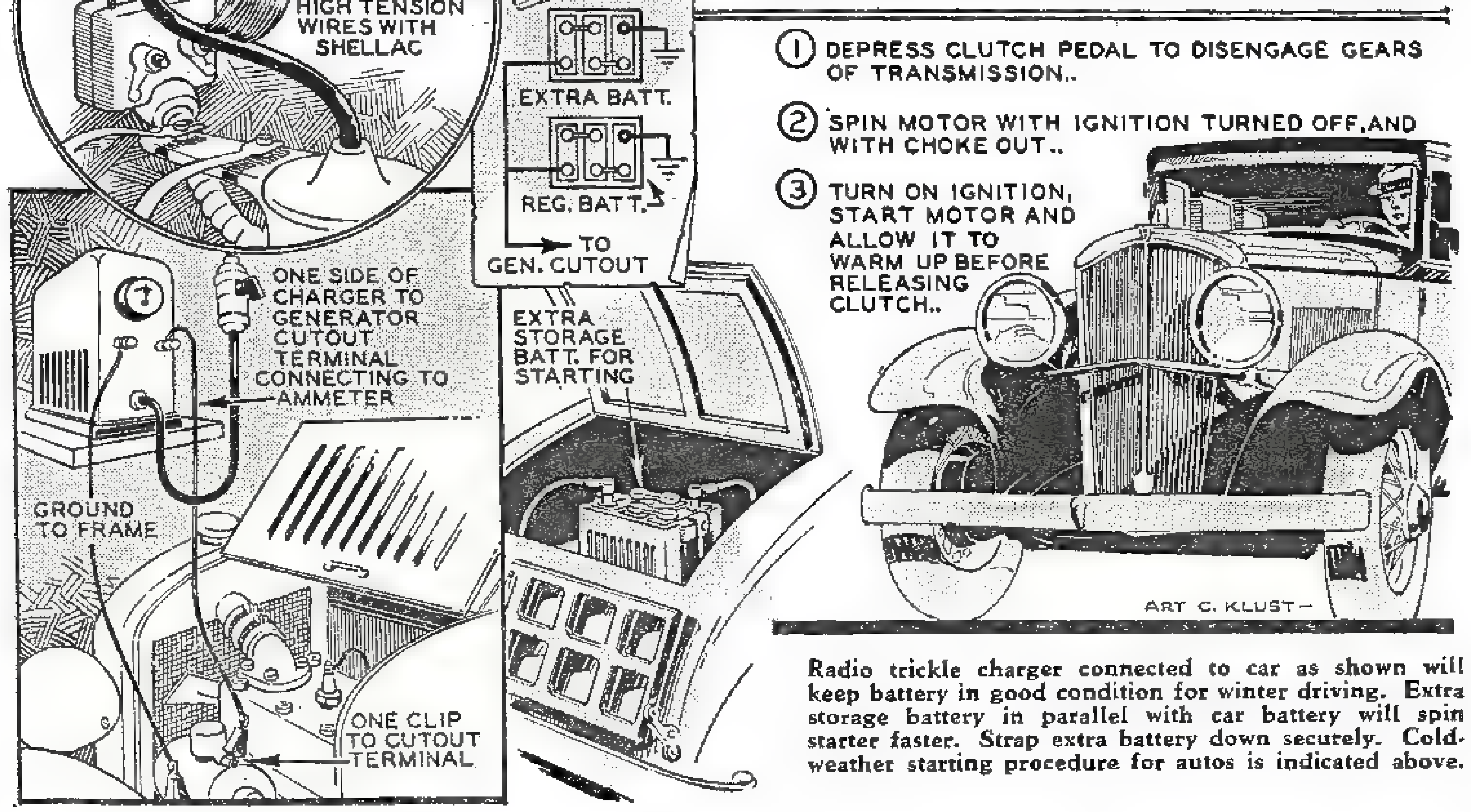
Even with the generator charging rate set at the maximum, it will be impossible on some cars to keep the battery fully charged in winter. A radio trickle charger connected to the car battery each night will save many a trip to the battery service station. Attach spring clips to each lead, snapping one to the frame of the car, the other to the cutout terminal. Polarity is correct when the ammeter shows "charge" as the charger is switched on.

Where an engine is unusually hard to start, or where a car is left out on the street all day, an extra storage battery is recommended. Strap this down somewhere in the back of the car, and make connections with regular starter cable. If the negative of your battery is grounded, one cable should go from the negative of the extra battery to the frame of the car, the other to the positive of the regular battery. In connecting "hot" leads together, scrape off insulation for a few inches, wrap bare copper wire over the two leads, and apply solder freely to the joint, using acid if necessary to clean the copper. With this parallel connection both batteries will be charged at the same time by the auto generator.

(Cont'd on page 126)


CARBURETOR AND MANIFOLD ASSEMBLY
ETHER
WASTE OR SPONGE OR CLOTH, WET WITH ETHER, IS HELD TO AIR-INTAKE OF CARBURETOR
WIRE GUARD AND REFLECTOR KEEPS LAMP FROM CONTACT WITH ENGINE OR BLANKET
60W. OR 100W. LAMP IN 110V. SOCKET
PLACE THE LAMP AGAINST CARBURETOR AND MANIFOLD.. COVER ENGINE WITH BLANKET
B-764
SHELLAC
PAINT ALL HIGH TENSION WIRES WITH SHELLAC

Ether-soaked rag held near the carburetor intake makes starting of cold engine easier. To keep engine warm during cold nights, place electric bulb near carburetor, then cover engine with blankets. Shellac wires to keep out moisture.

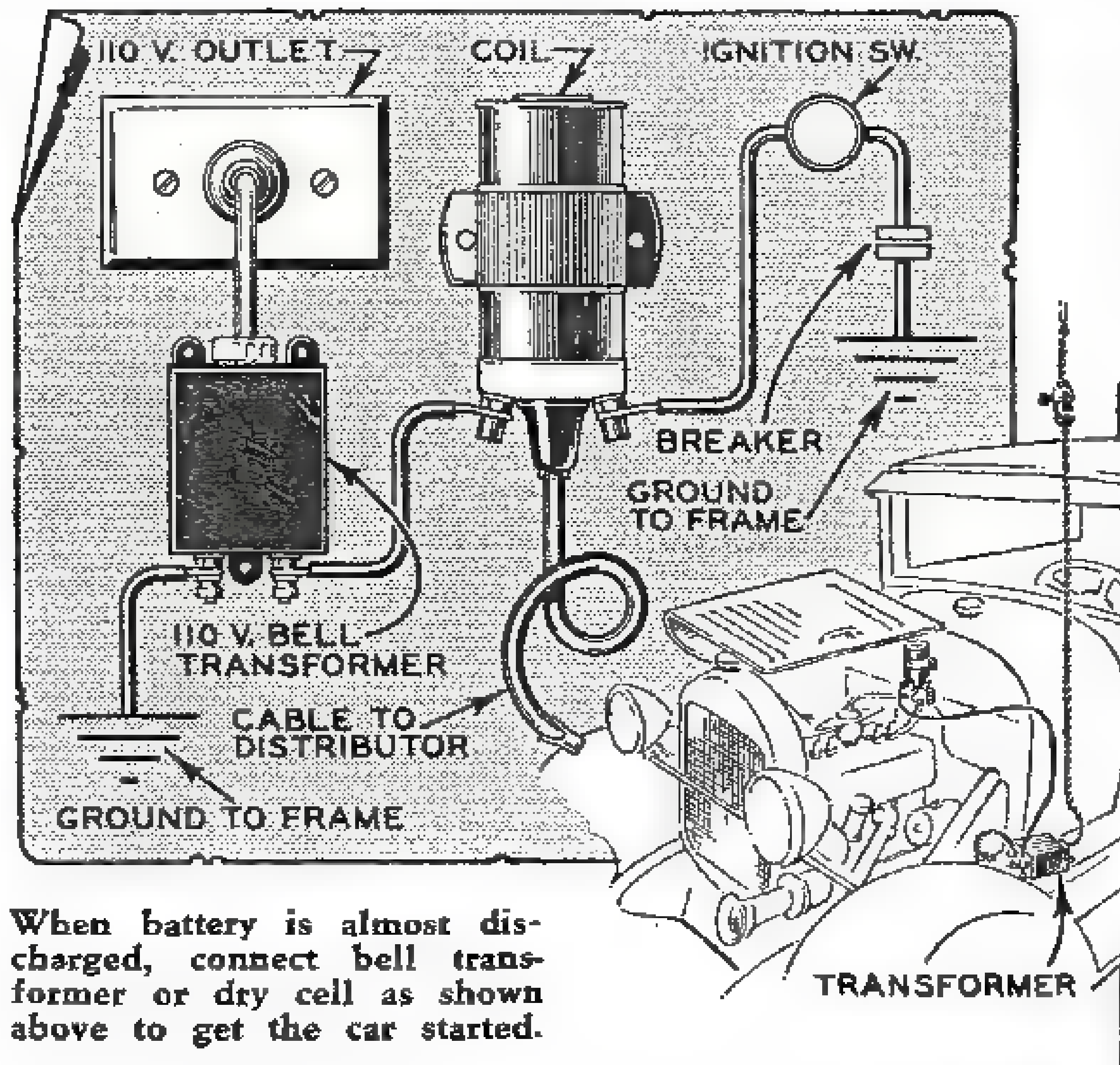

EXTRA BATT.
REG. BATT.
TO GEN. CUTOUT
ONE SIDE OF CHARGER TO GENERATOR CUTOUT TERMINAL CONNECTING TO AMMETER
GROUND TO FRAME
ONE CLIP TO CUTOUT TERMINAL
EXTRA STORAGE BATT. FOR STARTING
ART C. KLUST—

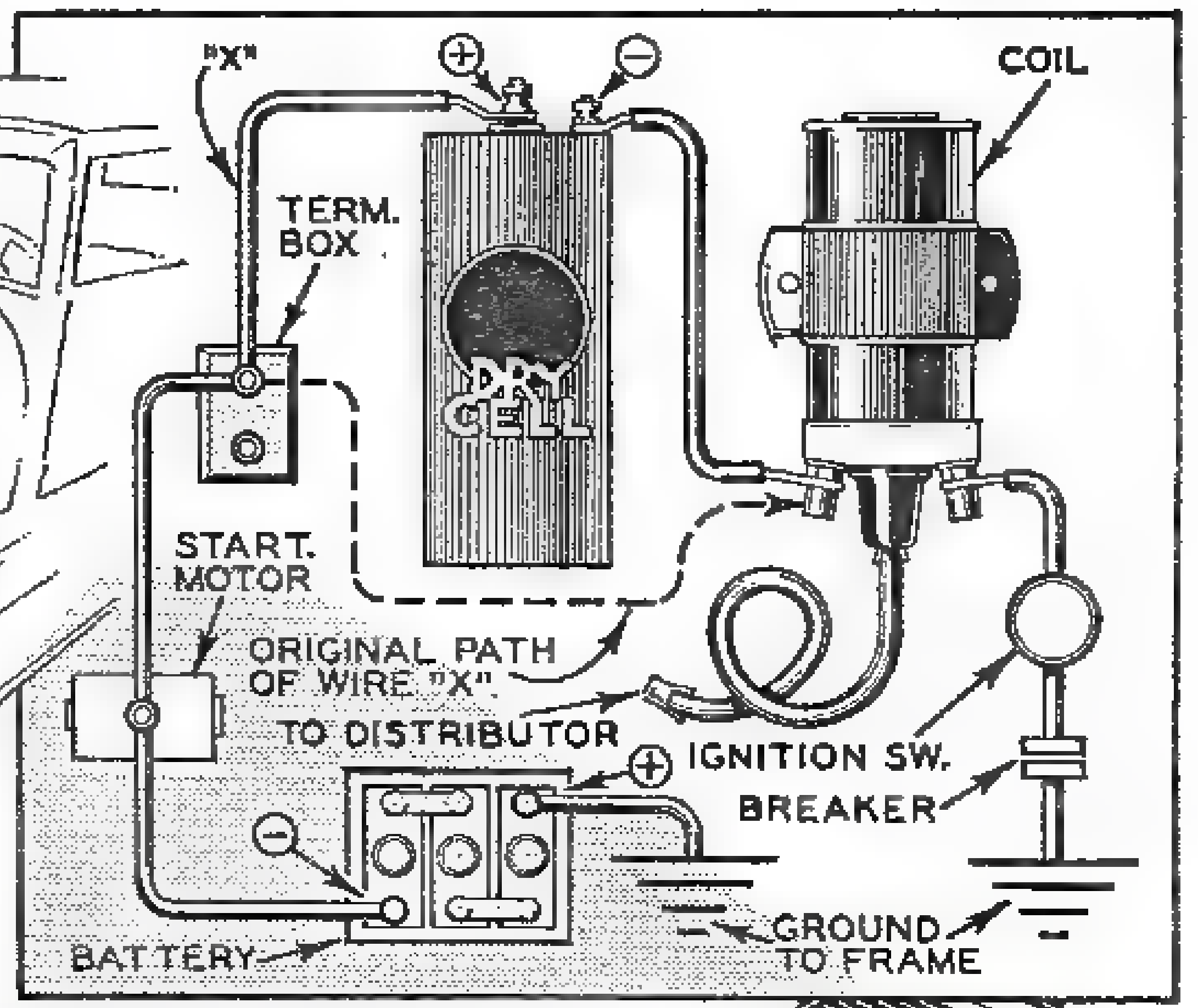
① DEPRESS CLUTCH PEDAL TO DISENGAGE GEARS OF TRANSMISSION..

② SPIN MOTOR WITH IGNITION TURNED OFF, AND WITH CHOKE OUT..

③ TURN ON IGNITION, START MOTOR AND ALLOW IT TO WARM UP BEFORE RELEASING CLUTCH..

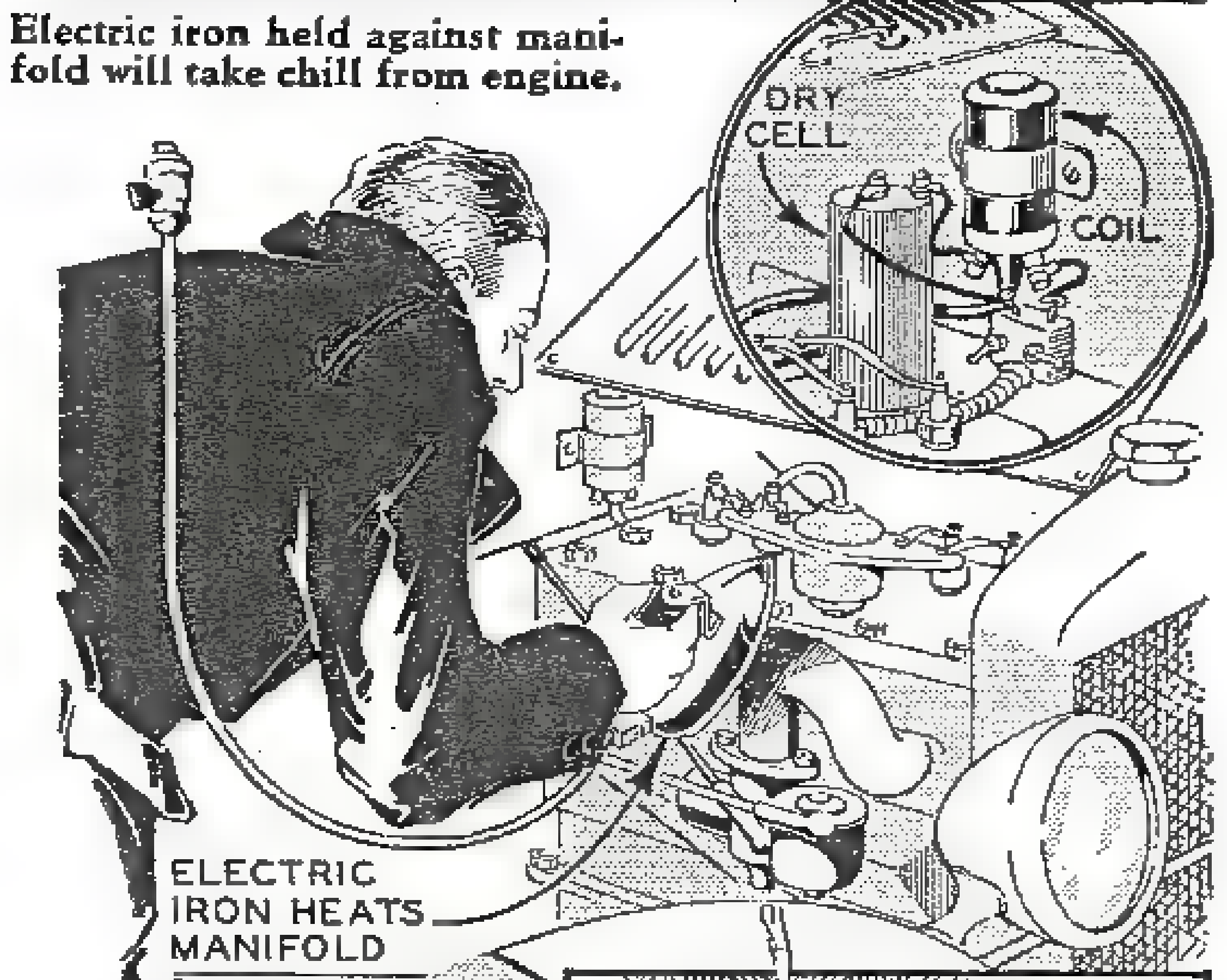
Radio trickle charger connected to car as shown will keep battery in good condition for winter driving. Extra storage battery in parallel with car battery will spin starter faster. Strap extra battery down securely. Cold-weather starting procedure for autos is indicated above.

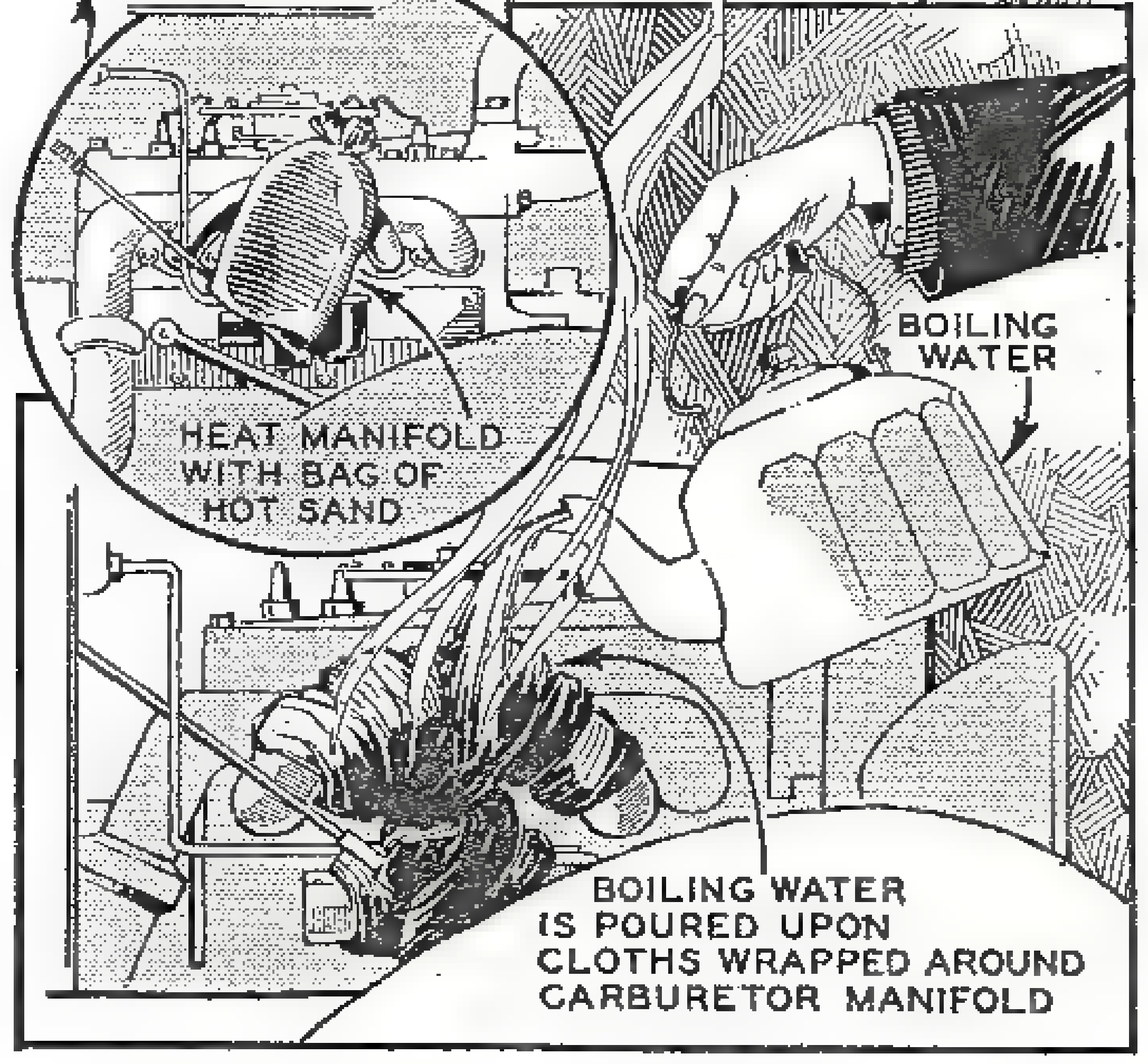

110 V. OUTLET
COIL
IGNITION SW.
BREAKER
GROUND TO FRAME
110 V. BELL TRANSFORMER
CABLE TO DISTRIBUTOR
GROUND TO FRAME
TRANSFORMER


"X"
COIL
TERM. BOX
DRY CELL
START. MOTOR
ORIGINAL PATH OF WIRE "X".
TO DISTRIBUTOR
IGNITION SW.
BREAKER
BATTERY
GROUND TO FRAME

When battery is almost discharged, connect bell transformer or dry cell as shown above to get the car started.

Electric iron held against manifold will take chill from engine.


DRY CELL
COIL
ELECTRIC IRON HEATS MANIFOLD


HEAT MANIFOLD WITH BAG OF HOT SAND
BOILING WATER
BOILING WATER IS POURED UPON CLOTHS WRAPPED AROUND CARBURETOR MANIFOLD

Bag of hot sand placed over carburetor, manifold warms up engine. Quicker results are obtained by wrapping rags around carburetor and manifold, then pouring on boiling water. With carburetor warm, fuel vaporizes more easily.

Print Photographs in COLOR *on* METAL *Gifts*

by KENNETH MURRAY

Finished envelope holder having photographic view of old waterwheel printed in color on burnished copper surface is shown above. Personal photos or scenic views can be printed directly from negative upon metal, glass, wood, or any other smooth, light-colored surface by process described in text. Fig. 2—A strip of copper ¼″ wide all around design is pounded down over hardwood form with wood mallet, working carefully to avoid wrinkles in any one spot.

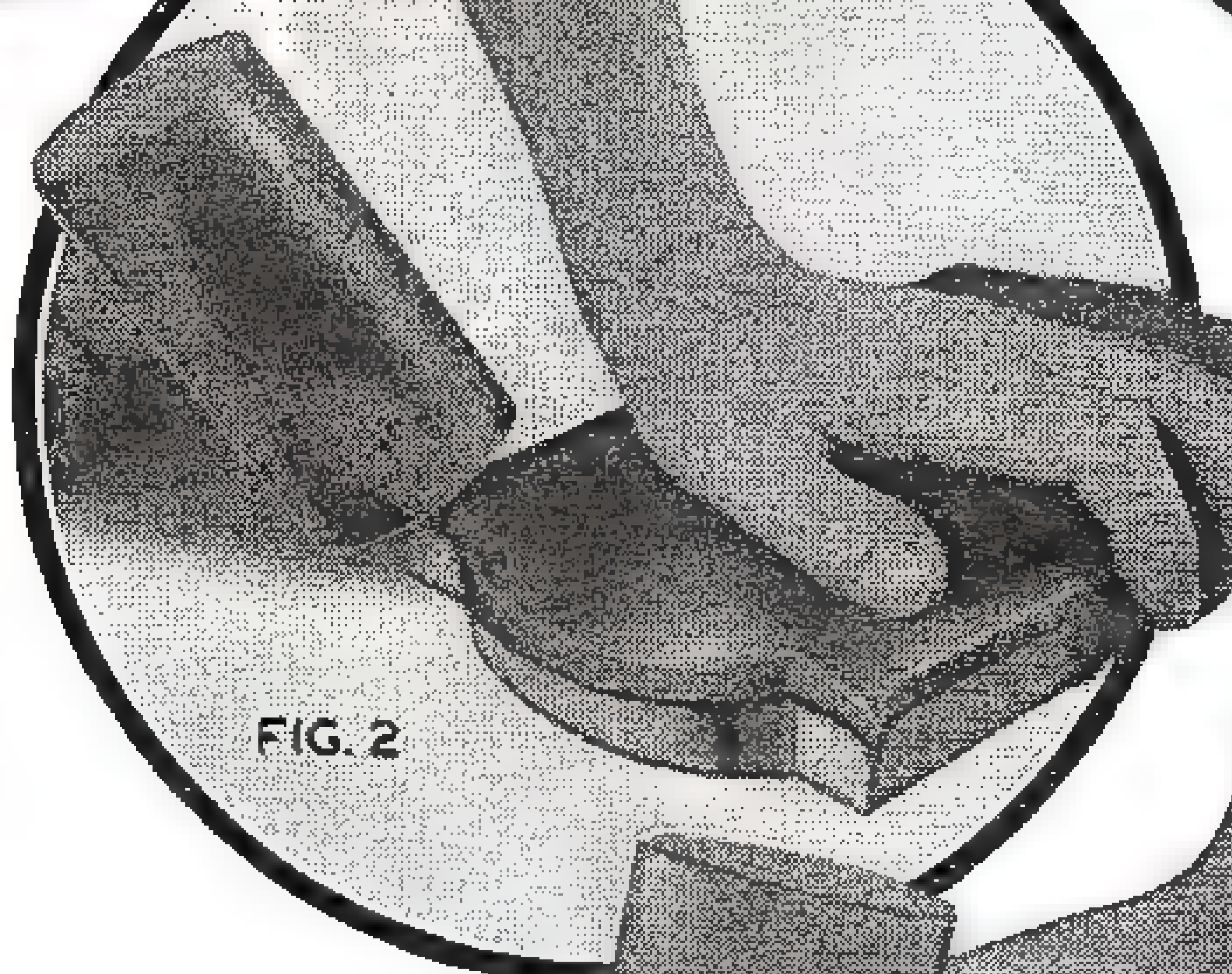


FIG. 2

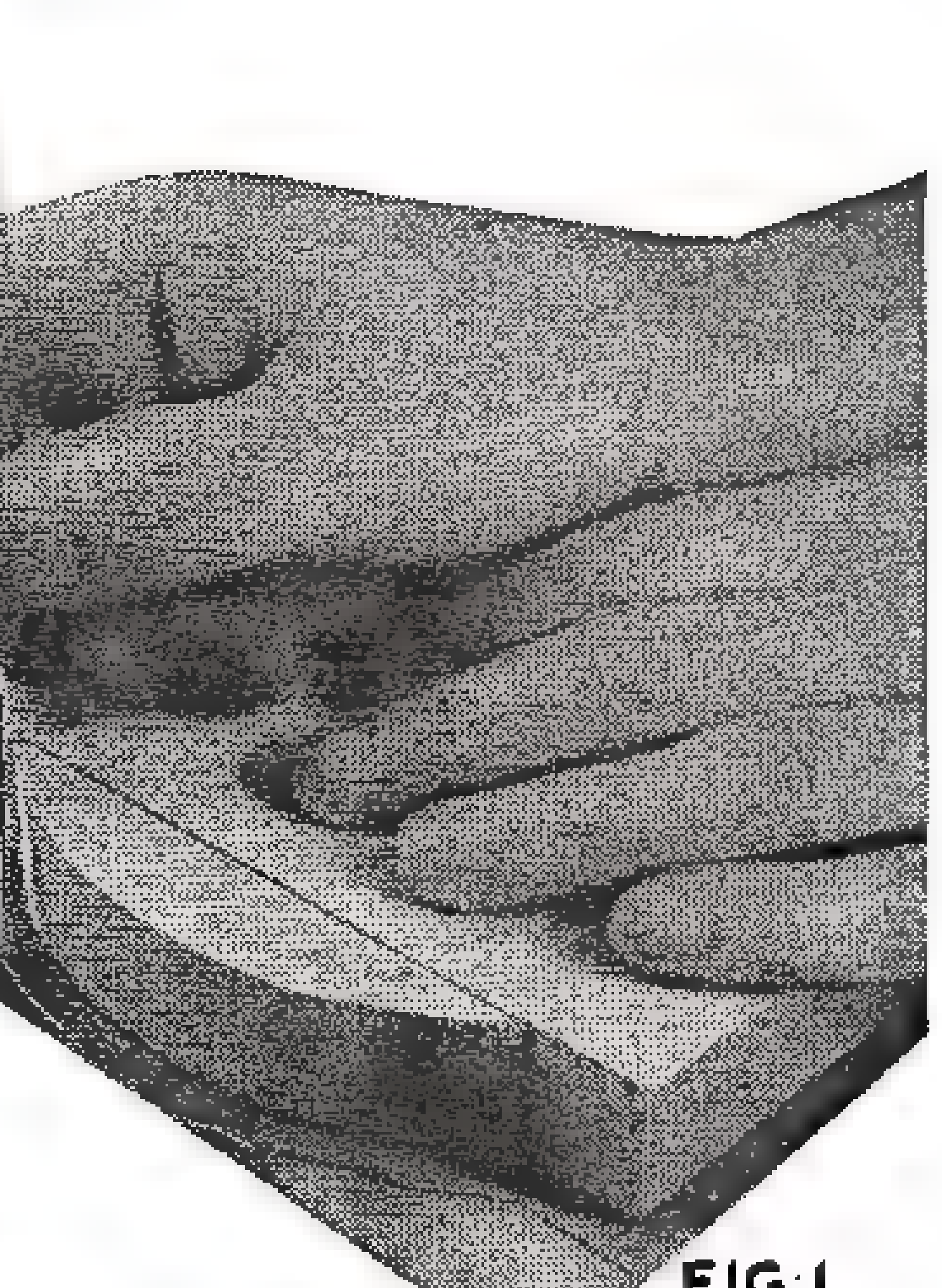


FIG. 1

Fig. 1.—Design for letter holder is first cut out from hardwood form. Sheet of copper is marked for cutting so that it will be ¼″ larger, on all sides, than wood form. Trim off surplus copper with tin snips, then file smooth.

YOU can inject a personal note into your Christmas gifts this year by placing on them photographs of yourself, of friends or of scenes you have snapped with your camera. Any smooth surface can be treated in this way, including metal, wood, glass or composition. The pictures are permanent, can be made in any color, and have the shiny, glass-like appearance of glazed enamel.

As an example of a home shop project easily treated by this process, the construction of a copper envelope holder, an always-appreciated gift, will be explained. Secure a piece of 6 in. by 10 in. sheet copper of about No. 16 gauge from a plumbing shop. Make sure that it has no dents or scratches. A shaping form is made of 1 in. wood, 5½ in. wide and with one end cut in a curve or design. Mark the copper, at both ends, with the same design, but allow ¼ in. on the edges for turning over. Round all sharp corners of the wood form. Then, with a wood mallet pound down the edges of the copper. Turn the sheet over and pound the edges back down on themselves carefully, using light taps to avoid buckling. This reinforces the sheet so that it will be rigid when it is bent into a "U" shape. Allow 2½ in. for the bottom; one side is 3 in. high, the other 4 in. high.

With fine pumice or some other good abrasive polish the side that is to receive the photograph until it is smooth and glossy. Dry the surface carefully, and see that no bits of lint or other foreign matter which would cause specks in the photograph adhere to it.

You can get small sheets of clear gelatine at the drug store; soak several in cold water until they are limp. Heat a pan of water; into it place a wide-mouth bottle containing four or five ounces of water. Add just enough of the soaked gelatine to make a solution of the consistency of syrup. This must be filtered twice through a wad of cotton in the neck of a funnel, so that it will be entirely clear and free of lumps and particles. The "sensitizer" is a simple solution of ammonium dichromate. Dissolve as many of the red crystals in an ounce of warm water as possible. Add sufficient of this solution to the liquid gelatine to give the latter a deep orange color.

Coating of the cleaned copper surface is done in a room with a yellow light. The light from an ordinary bulb covered with a thickness of yellow paper will be entirely safe. Flow the orange gelatine solution over the copper surface while the latter is held level in one hand. Drain the excess solution back into the bottle to be used again. Allow the gelatine to drip from one corner of the copper while holding it over a gas or electric stove, letting the copper become

(Continued on page 122)

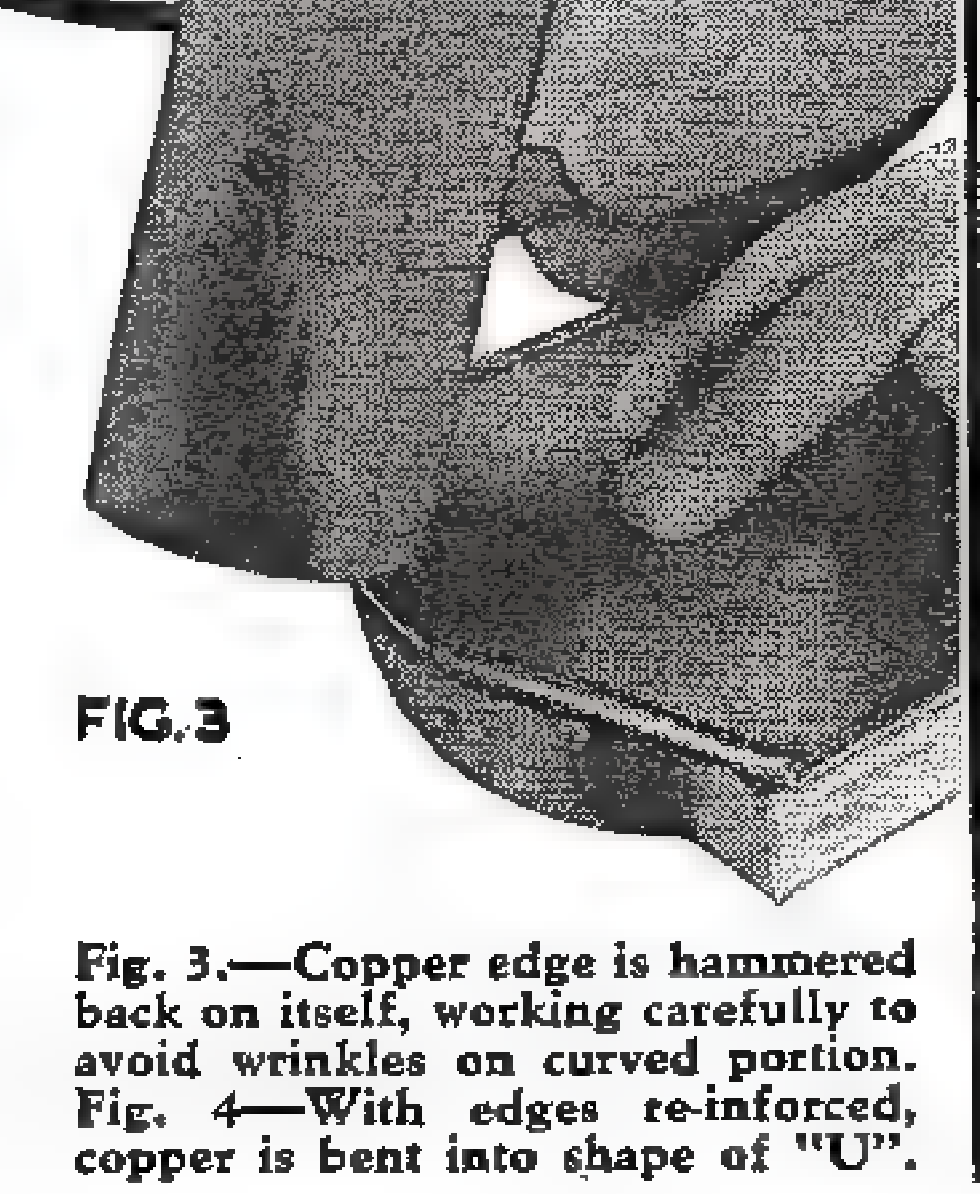


FIG. 3

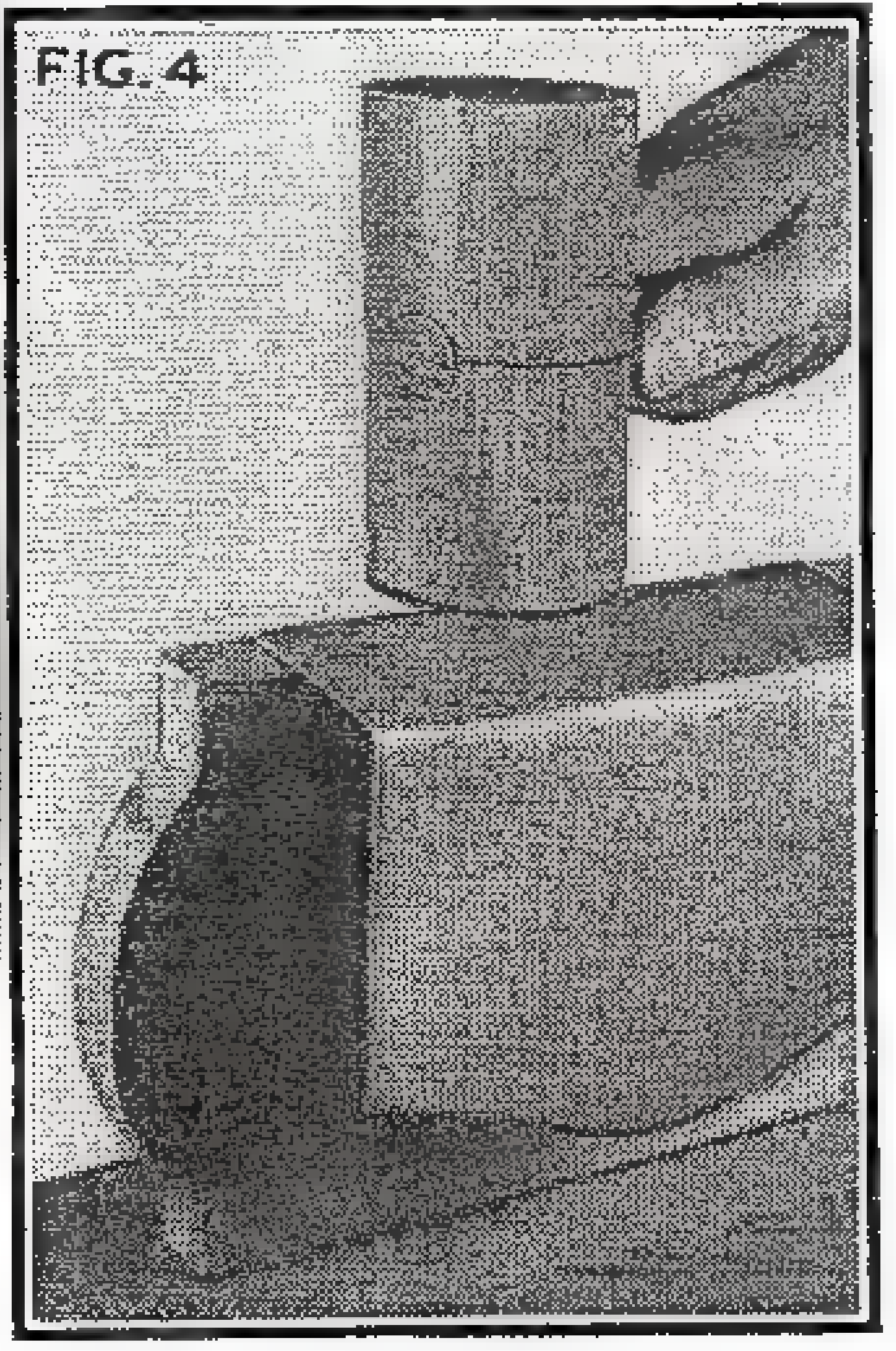


FIG. 4

Fig. 3.—Copper edge is hammered back on itself, working carefully to avoid wrinkles on curved portion. Fig. 4—With edges re-inforced, copper is bent into shape of "U".

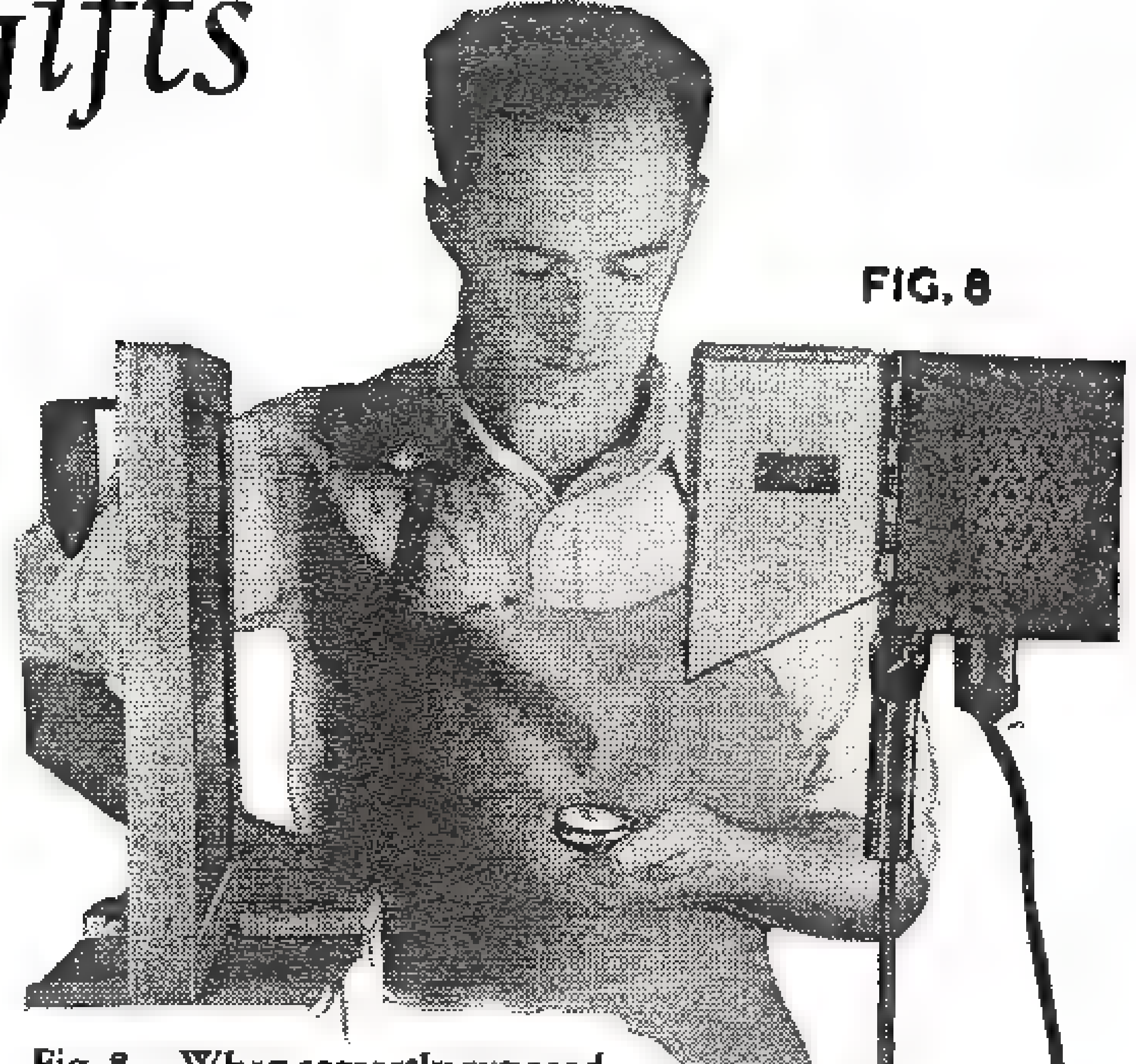


FIG. 8

Fig. 8—When correctly exposed before arc lamp or in sunlight faint brown image will just be visible on copper holder.

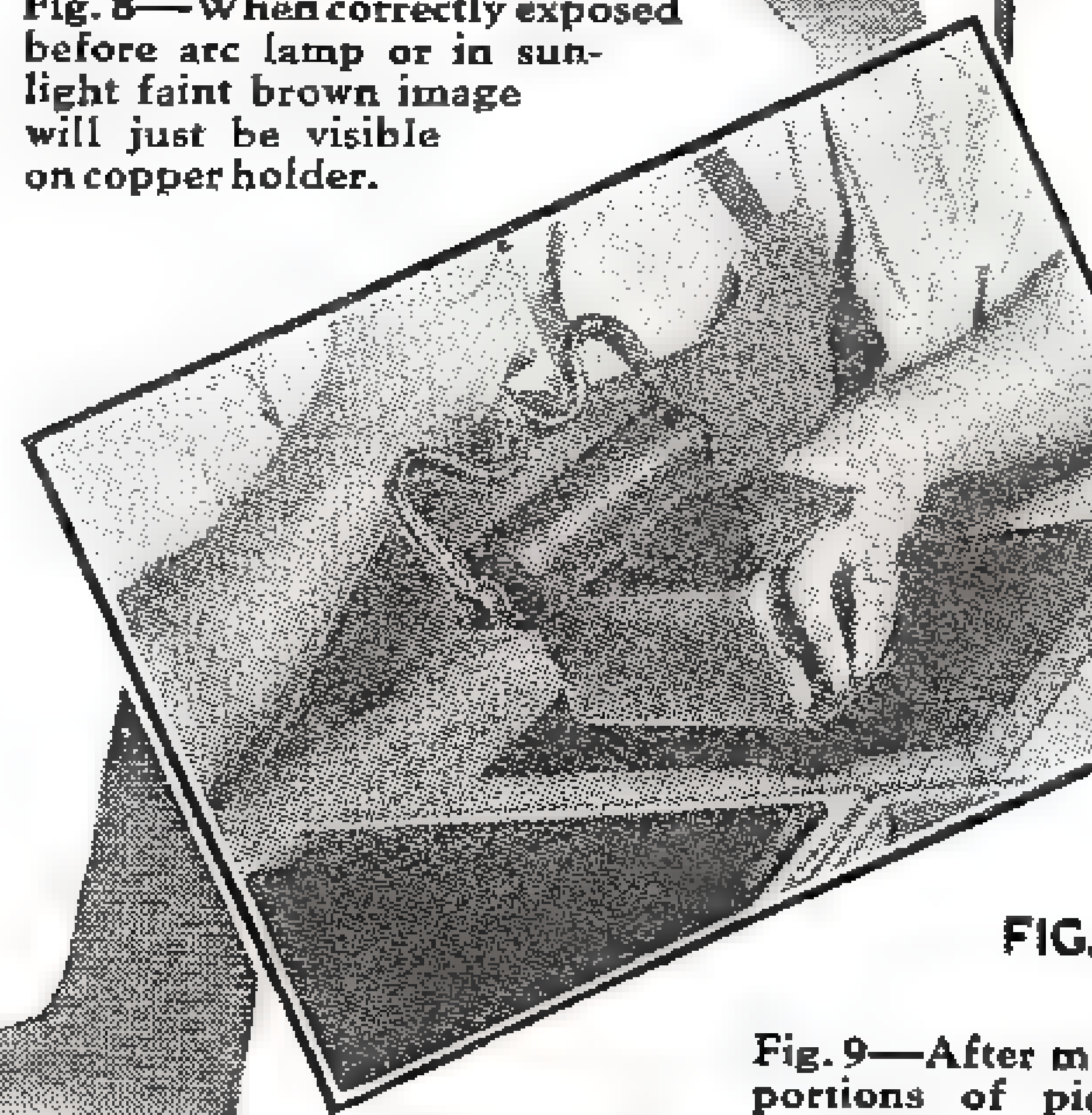


FIG. 9

Fig. 9—After masking off portions of picture not needed, copper is "inked up" with ordinary ink roller and selected color of lithograph ink. Repeat inking process until all details of photo show clearly. Fig. 10.—Photo as well as copper face of letter holder can be protected by spraying with lacquer.

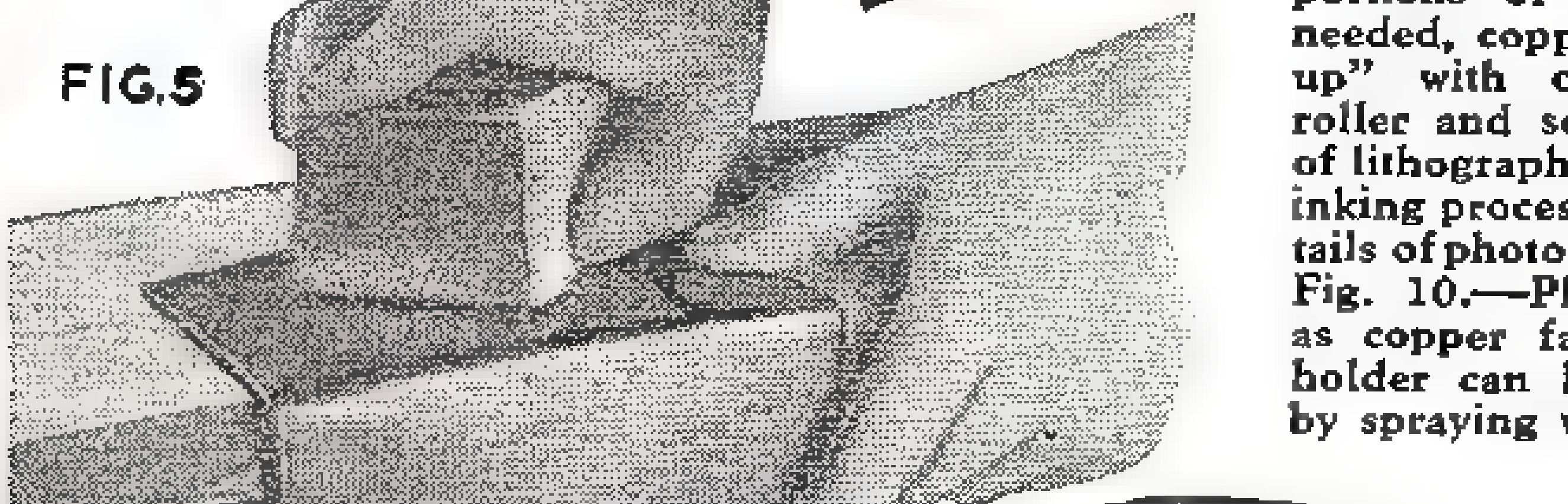


FIG. 5

Fig. 5—Polish surface receiving photograph to high gloss, using pumice or other abrasive.

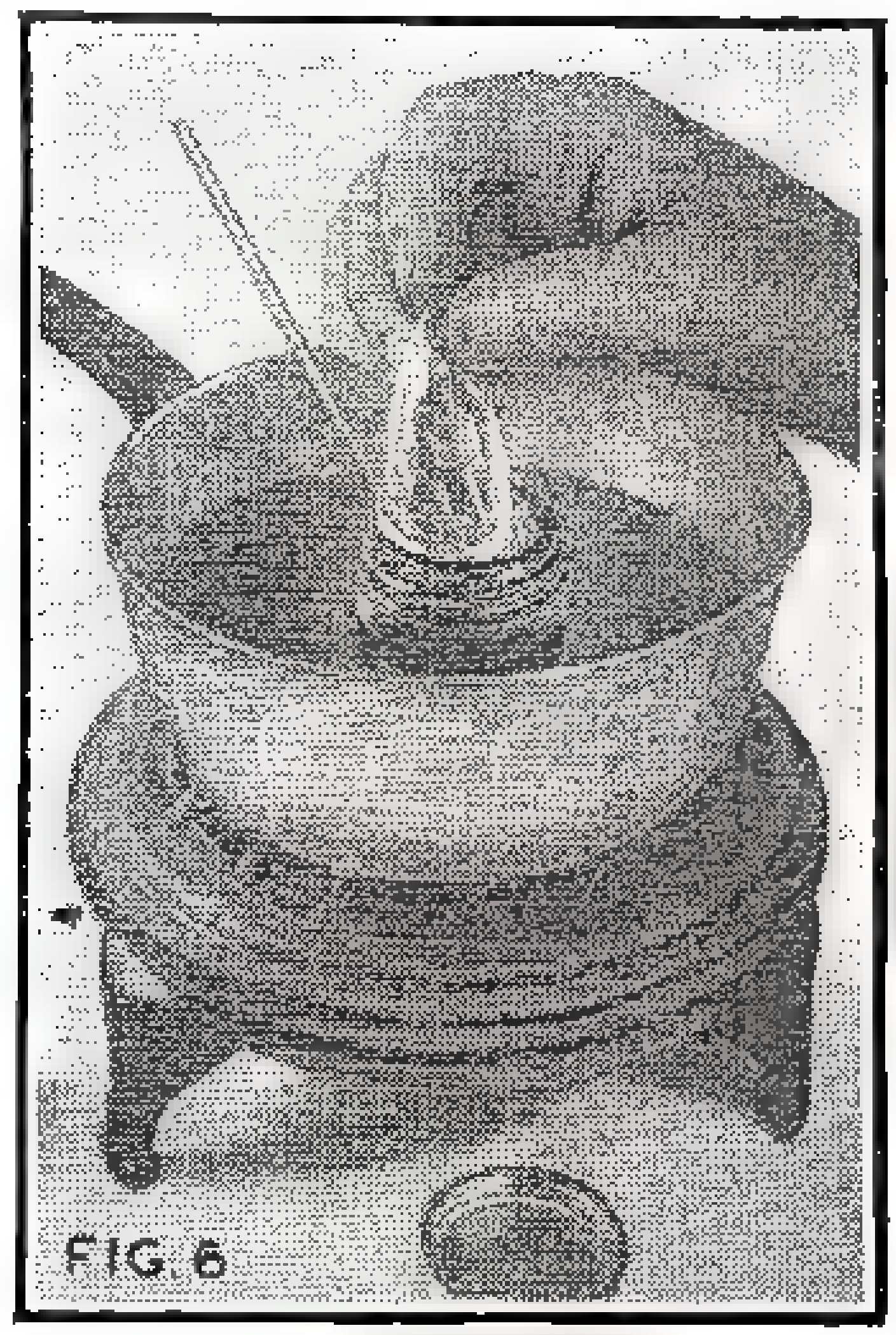


FIG. 6

Fig. 6—Add softened sheet gelatin to five oz. of hot water in wide-mouth bottle to make solution thick as syrup.

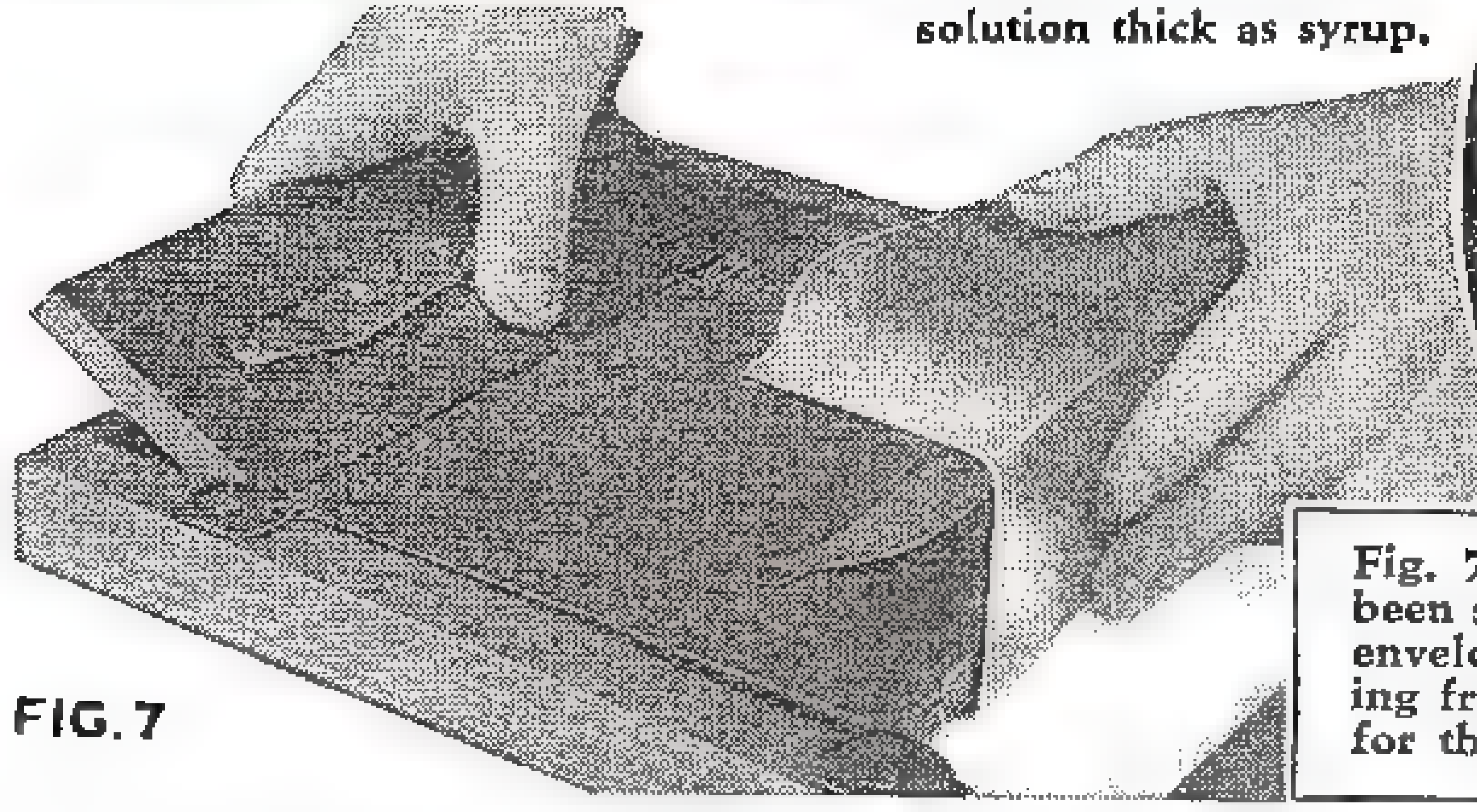


FIG. 7

Fig. 7—After "sensitizer" emulsion has been spread over copper and dried, place envelope holder under negative in printing frame. Use yellow light illumination for this work to prevent early exposure.

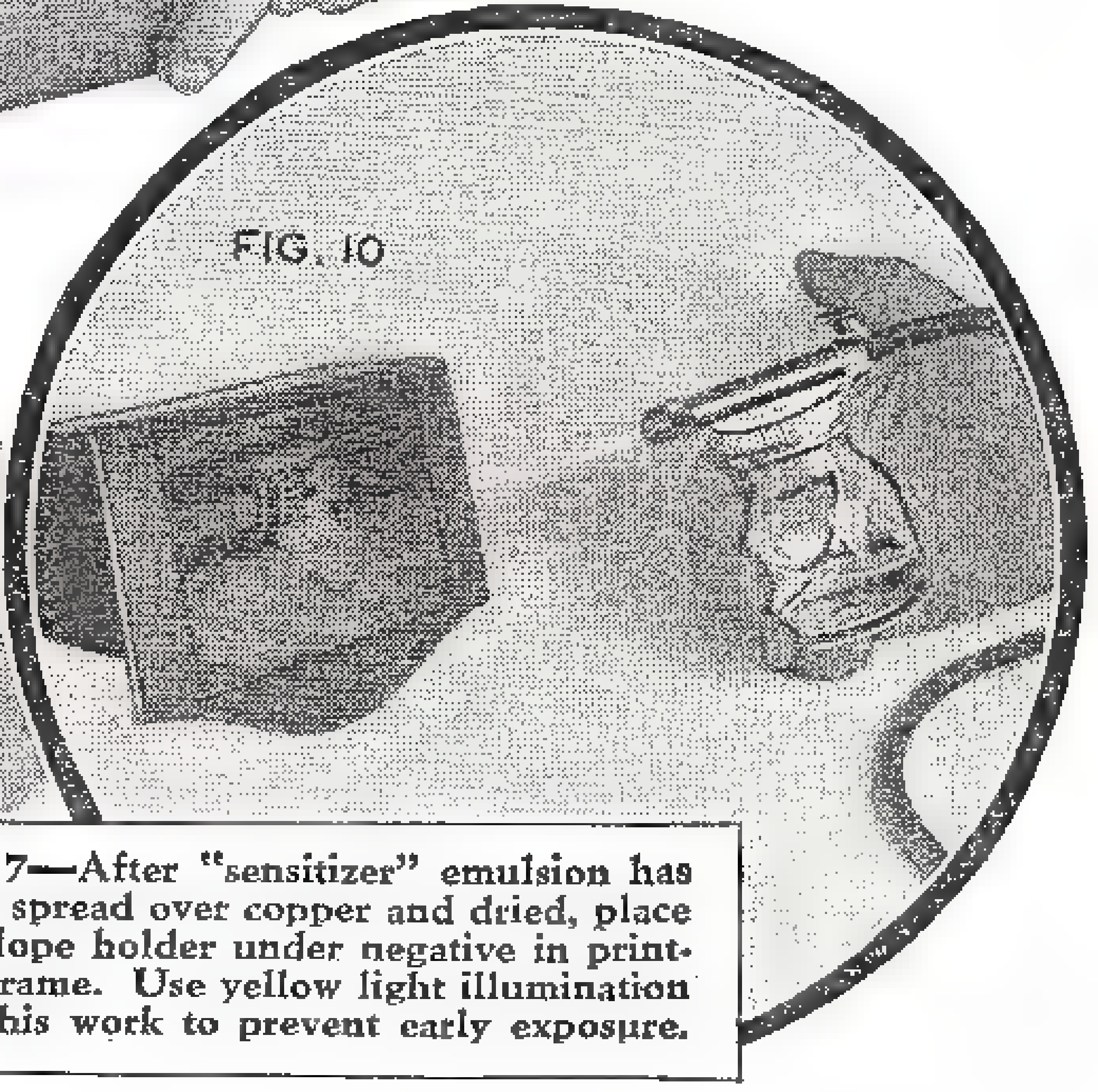
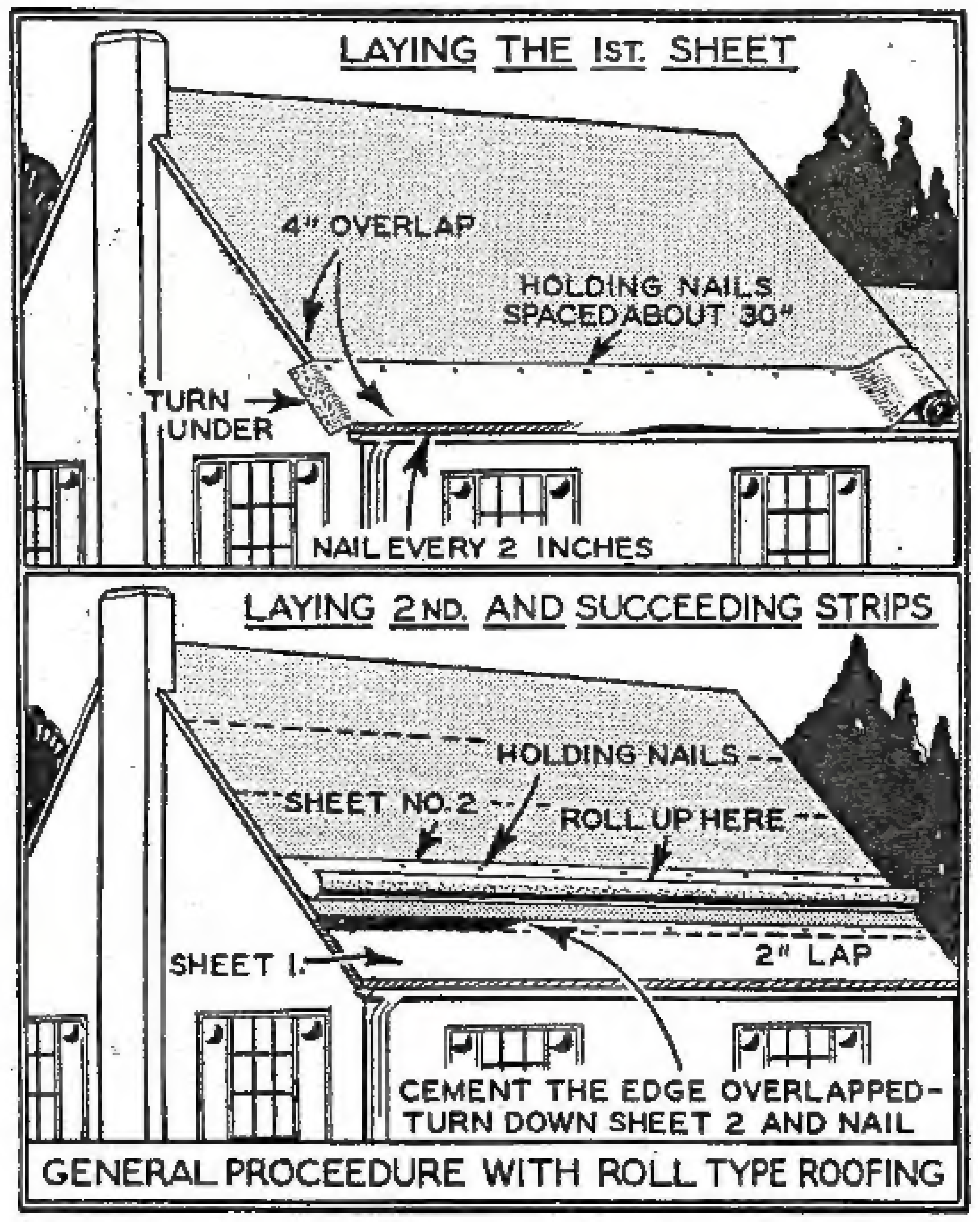


FIG. 10

How to IMPROVE *That* ROOF *on* YOUR HOUSE

by DALE R. VAN HORN

Repairing the roof on your home is not a difficult job. Cut down your heat bill by putting new roofing over the old and following other suggestions given here by Dale R. Van Horn.


LAYING THE 1ST. SHEET
4" OVERLAP
HOLDING NAILS SPACED ABOUT 30"
TURN UNDER
NAIL EVERY 2 INCHES
LAYING 2ND. AND SUCCEEDING STRIPS
HOLDING NAILS
SHEET NO. 2
ROLL UP HERE
SHEET 1
2" LAP
CEMENT THE EDGE OVERLAPPED-TURN DOWN SHEET 2 AND NAIL
GENERAL PROCEEDURE WITH ROLL TYPE ROOFING

Above drawings show how to apply roll roofing. Put first strip on lower edge overlapping next until roof is done.

THE roof is the crown on your home. No matter how good the walls, what expensive furniture inside, or how well the rest of the structure has been built, without a good roof, your abode is not first class.

A suitable covering, both weatherproof and durable, plus adequate support underneath are the two fundamentals of a good roof. Details may vary. Many homes today are covered with composition shingles having fire-resisting properties, incorporating the advantages of color combinations. A goodly number of home owners still prefer good old fashioned red shingles. The type of roofing material is largely up to you.

If you go into your attic on a bright day and note many pin holes of light showing through, you easily will come to the conclusion that your roof is in line for a new dress. With this inspection comes, too, the condition of the eaves, the valleys, any sagging point, and whether the roof meets the wall without any sign of a gap.

One of the newer trends is to close gaps of this nature with a special material, forced into space with a gun not unlike the type used for force-greasing the automobile. There is no need to mention that the chief advantage of tight unions between walls and roof, or between wood and masonry, is the saving of heat in winter.

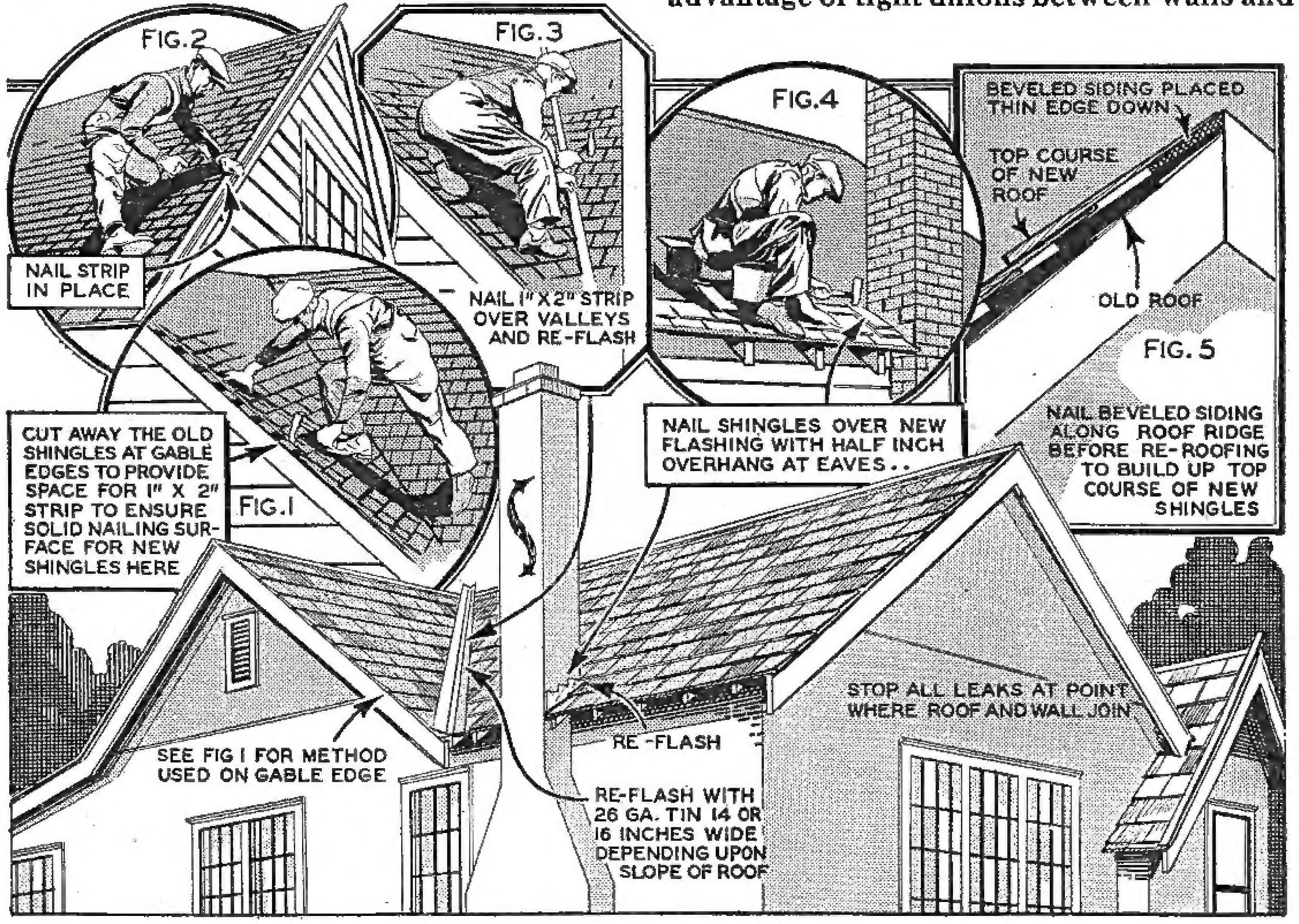


FIG. 2
FIG. 3
FIG. 4
BEVELED SIDING PLACED THIN EDGE DOWN
TOP COURSE OF NEW ROOF
NAIL STRIP IN PLACE
NAIL 1" X 2" STRIP OVER VALLEYS AND RE-FLASH
OLD ROOF
FIG. 5
CUT AWAY THE OLD SHINGLES AT GABLE EDGES TO PROVIDE SPACE FOR 1" X 2" STRIP TO ENSURE SOLID NAILING SURFACE FOR NEW SHINGLES HERE
FIG. 1
NAIL SHINGLES OVER NEW FLASHING WITH HALF INCH OVERHANG AT EAVES.
NAIL BEVELED SIDING ALONG ROOF RIDGE BEFORE RE-ROOFING TO BUILD UP TOP COURSE OF NEW SHINGLES
STOP ALL LEAKS AT POINT WHERE ROOF AND WALL JOIN
RE-FLASH
SEE FIG 1 FOR METHOD USED ON GABLE EDGE
RE-FLASH WITH 26 GA. TIN 14 OR 16 INCHES WIDE DEPENDING UPON SLOPE OF ROOF

Figures illustrate steps in putting new shingles over old roof. Shingles at gable edge are cut off and replaced with nailing strip. Old flashings remain, the new flashings being placed over them. Shingle from bottom upwards.

Before
After

When re-roofing consider home revision. Photos show how addition improved ordinary cottage.

Whereas a few years ago a yard cluttered with old broken shingles and a general mess proclaimed to one and all that the Jones' were having their roof recovered—today that confusion is missing. Putting the new roof right on over the old is smart because of the saving of labor and debris, and because the old covering plus the new gives greater roof insulation properties.

Approaching the job in the proper manner, it will be wise to keep in mind the several steps portrayed in an accompanying group of illustrations. Note that the shingles are cut away from all edges to permit the laying of a strip. (See Figs. 1 and 2). This applies to roof edges, the ridge and dormers as well. Instead of tearing out old valleys and flashings, foundations for new sheet metal are built up easily as shown in Figs. 3 and 4. From then on, the work progresses much as though the house were new and it was being roofed for the first time.

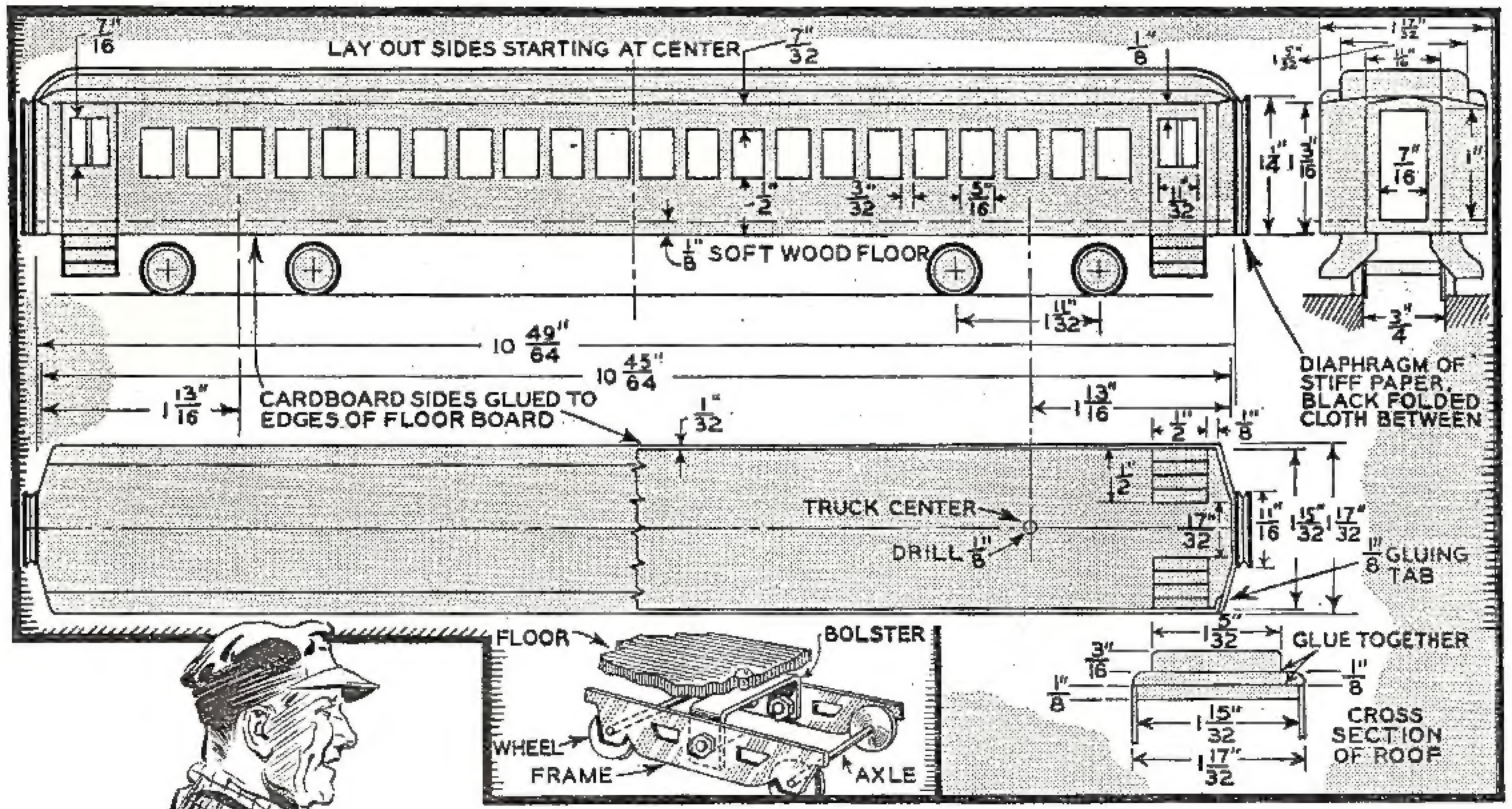
Of even simpler application is composition roll roofing, which is laid on as indicated in accompanying drawings. Those of you who insist upon asbestos base composition roofing have a choice of the roll roofing, and individual squares of composition asbestos or slate.

Some wooden shingles are chemically treated to make them fire resisting. Sometimes the roof is fundamentally good, does not warrant the cost of a recovering job. Then by careful patching, and particularly by staining the shingles, a new-roof appearance results.

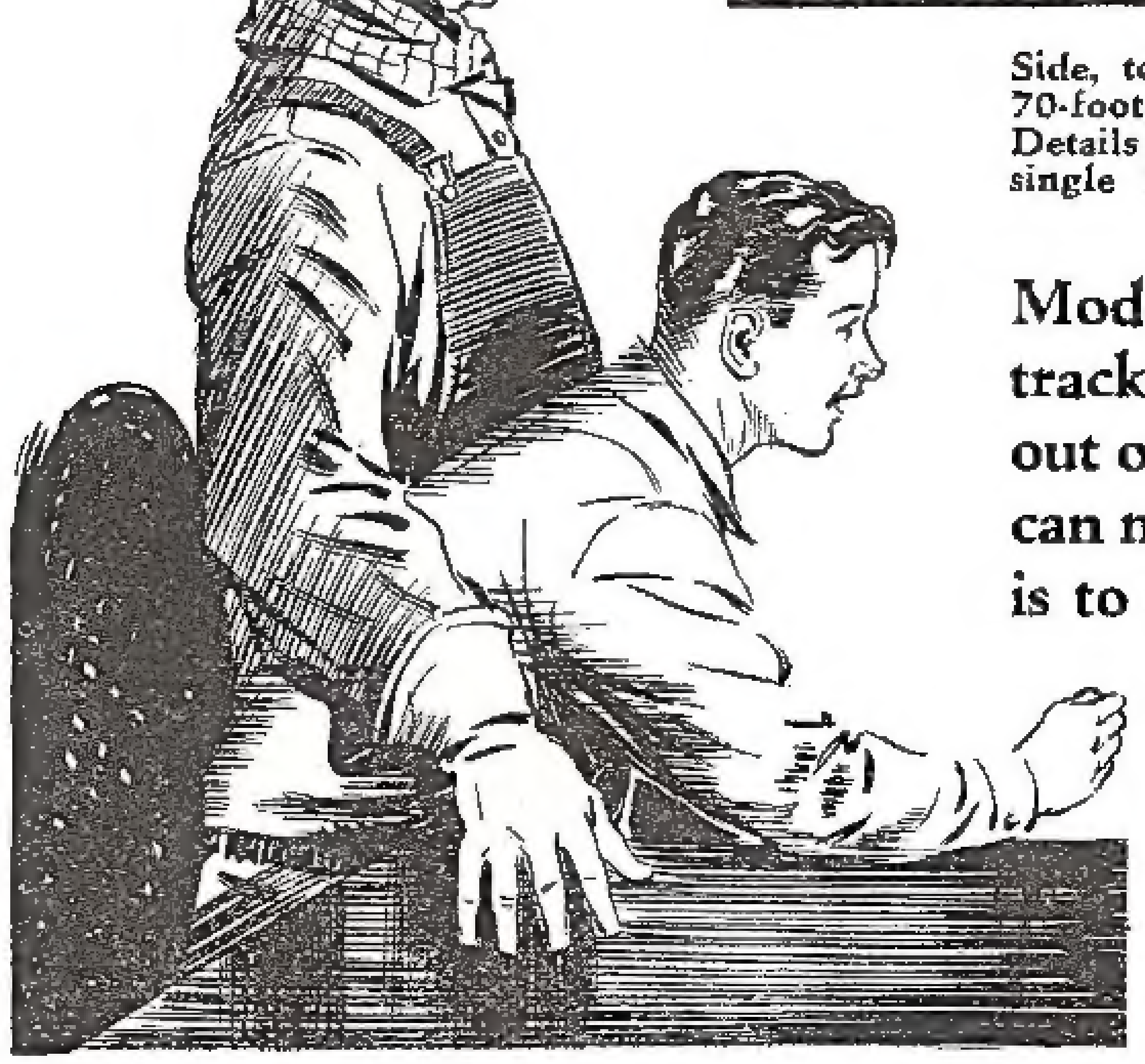
When doing over your roof, keep in mind the possibility of finishing the attic. If this is contemplated in the near future, then the floor space should be divided into the future rooms and the studding set in place at this time. Later it will be only a matter of applying the wall finish material and this addition of the studding will more firmly brace the roof timbers.

One of the best ways to chink spaces between the wall top and the roof is with concrete mortar to which has been added a

Build an 00-Gauge COACH for Your Table Top Railway


LAY OUT SIDES STARTING AT CENTER
7/16"
7/32
1/8"
1/2"
3/32
5/16
11/32
1/8" SOFT WOOD FLOOR
11/32
10 49/64"
10 45/64"
1 13/16
CARDBOARD SIDES GLUED TO EDGES OF FLOOR BOARD
1/32"
1 13/16
1/2
1/8"
DIAPHRAGM OF STIFF PAPER, BLACK FOLDED CLOTH BETWEEN
1 1/2"
1 3/16
7/16"
3/4"
TRUCK CENTER
DRILL 1/8"
17/32
1 15/32
17/32
GLUING TAB
FLOOR
BOLSTER
WHEEL
FRAME
AXLE
1 5/32
3/16"
1/8"
GLUE TOGETHER
1 15/32
1 17/32
CROSS SECTION OF ROOF

Side, top, and end views of 00-gauge coach are based upon actual 70-foot railway coach, scaled down at rate of 4 millimeters to foot. Details show how bolster of truck is fastened to floor of coach with single bolt, and how built-up roof fits into the cardboard sides.



Model railroad systems in 00-gauge, using tracks but three-fourths inch wide, can be laid out on an ordinary table. H. T. Nieter, American model engineer, shows here just how easy it is to build an 00-gauge 70-foot railway coach.

by H. T. NIETER

WITHIN the last few years the 00-gauge for model railroads has attracted the attention of many who, because of space limitations in their homes, could not build standard 0-gauge equipment. With tracks only ¾" wide, an entire system including stations, tunnels, bridges, and semaphores can be set up on a dining room table, or mounted on sections of wallboard which are easily folded up and packed away in a closet.

The American gauge or width of ¾" is used for the tracks in this project, this being closer to the gauge width obtained from the 4 millimeter to the foot scale than the ⅝" gauge used by English model builders.

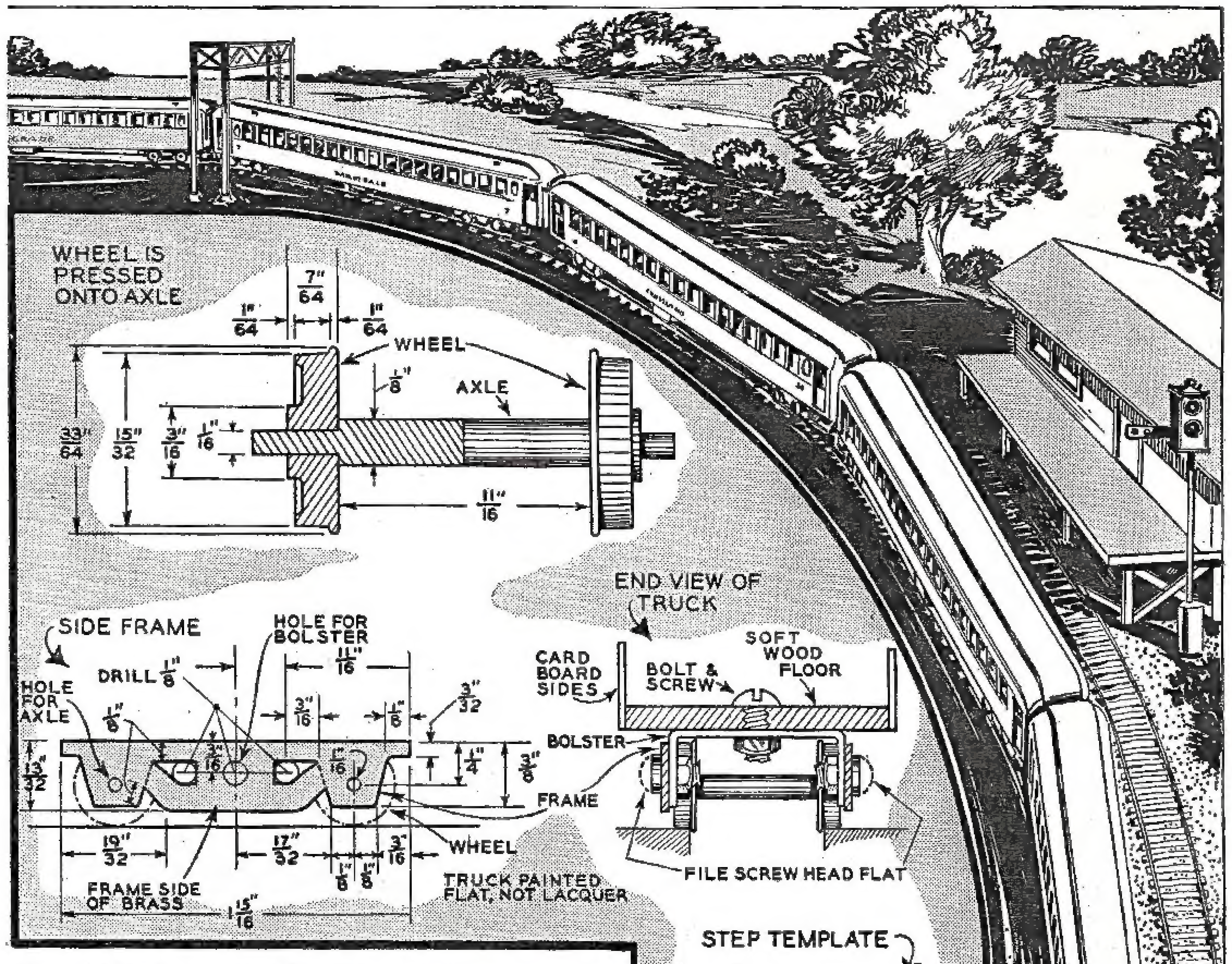
With scale disposed of, the actual construction of the coach may be begun. The materials specified here are the simplest to handle, and are obtainable at a minimum of cost.

The floor is cut from a piece of ⅛" thick soft wood. Mark each side at a point ⅛" from the end, then bevel the corners as shown, leaving a 17/32" flat section for the vestibule.

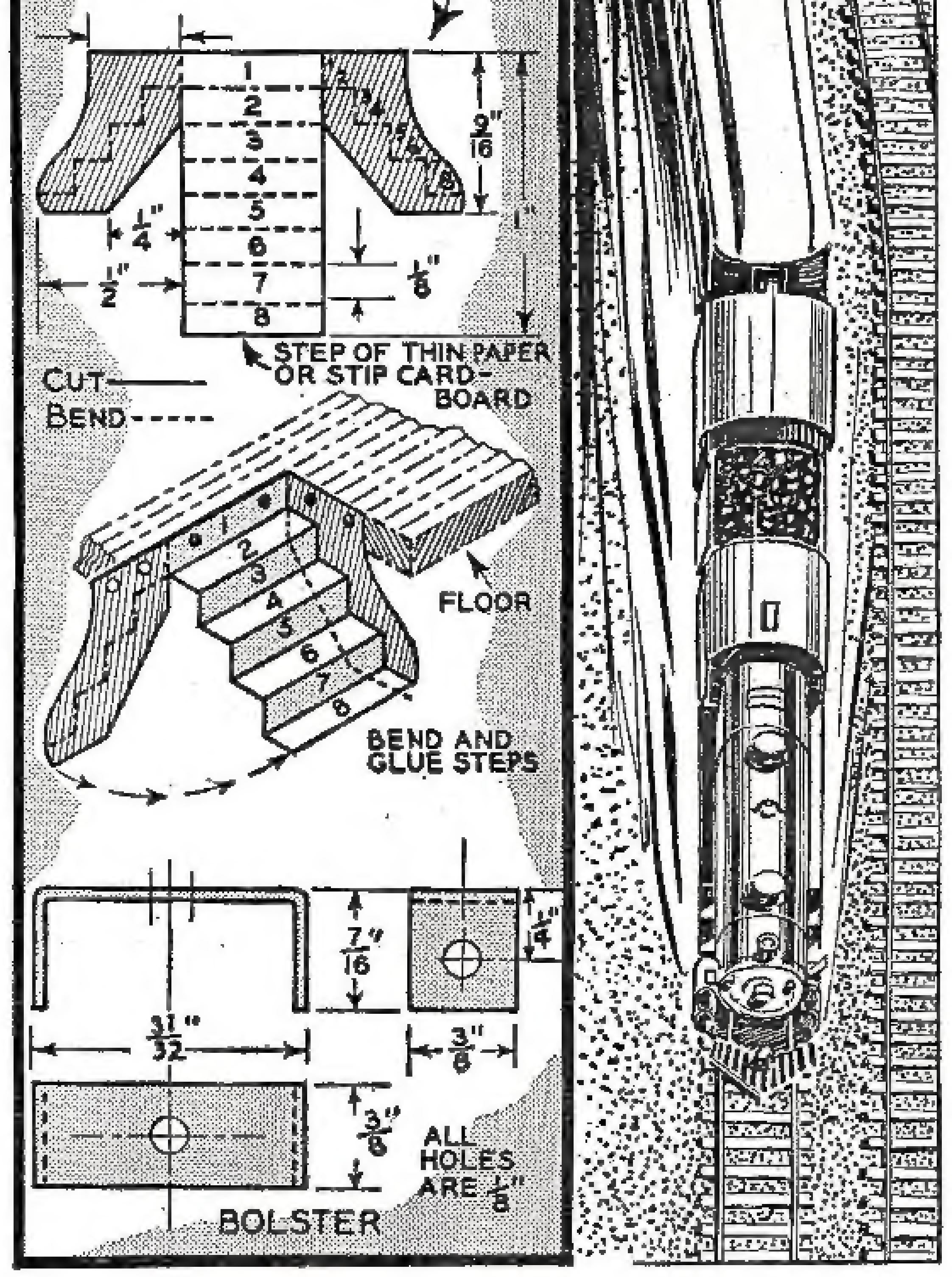
Locate and drill holes for the truck centers, then cut out the ½"x½" squares on each end for the steps.

The sides of the car will require 1/32" cardboard similar to that used by laundries as shirt-stiffeners. One side and end may be cut in a single piece, or the entire side of the car cut at once. Add a ⅛" tab wherever the cardboard ends are glued together.

Following the dimensions on the drawing, mark out the windows and doors on the cardboard strips, starting at the center of a section and working toward the ends.


WHEEL IS PRESSED ONTO AXLE
7/64"
1/64"
1/64"
WHEEL
1/8"
AXLE
33/64
15/32
3/16
1/16
11/16"
END VIEW OF TRUCK
SIDE FRAME
HOLE FOR BOLSTER
HOLE FOR AXLE
DRILL 1/8"
11/16
3/16
1/16
3/32
CARD BOARD SIDES
BOLT & SCREW
SOFT WOOD FLOOR
BOLSTER
FRAME
1 3/32
1/4"
3/8"
19/32
17/32
3/16
1/8
1/8
WHEEL
FRAME SIDE OF BRASS
1 15/16
TRUCK PAINTED FLAT, NOT LACQUER
FILE SCREW HEAD FLAT

Above details show construction of truck for 00-gauge coach. While brass is preferable, any other available metal may be used. When train is in use, bearings should be kept well-oiled to reduce friction. Lay out full size template for steps to dimensions shown at right, then trace out number needed. Make up four or five coaches for each engine used.


STEP TEMPLATE
1
2
3
4
5
6
7
8
9/16"
1"
1/4
1/2"
1/8"
STEP OF THIN PAPER OR STIP CARD-BOARD
CUT
BEND
FLOOR
BEND AND GLUE STEPS
7/16
1/4"
31/32
3/8"
3/8"
ALL HOLES ARE 1/8"
BOLSTER

Cut out the windows in the sides and doors with a razor-blade or sharp knife. At the side doors, recess the card by cutting half-way through from the outside and peeling the layer to give the panel effect of a door that doesn't come flush with the rest of the side.

With the floor on a flat surface, and with its edges coated with glue, stand the sides up, one at a time, against it, pressing them tightly. They may be fastened in place with very small pins until the glue has set. Tie a string around the body now, and let it dry.

Although the roof may be purchased as a moulding, make your own if you want by a "bread-and-butter" construction borrowed from the model ship-builders. For this, three pieces 10 49/64" long will be needed; the top one to be 1 5/32" wide by 3/16" thick, the middle one 1 17/32" by ⅛", and the bottom, which fits inside the

(Continued on page 120)

FOR INVENTORS And Mechanical Minded Men

How TO OBTAIN A PATENT

Answers to Questions

on Page 29

1 By patenting the invention.

2 Send sketch or model and description with search fee to a registered patent attorney.

3 1101 U. S.—1279 Foreign.

4 Abraham Lincoln.

5 17 years.

6 It confers on patentee the exclusive right to make, sell and use the invention covered by the patent.

7 No. Pencil sketch and description will usually suffice.

8 A form on which an inventor may execute his sketch and description. When properly filled out it is documentary evidence of your conception of the invention.

9 Because a layman or a lawyer in general practice is not learned in patent office practice.

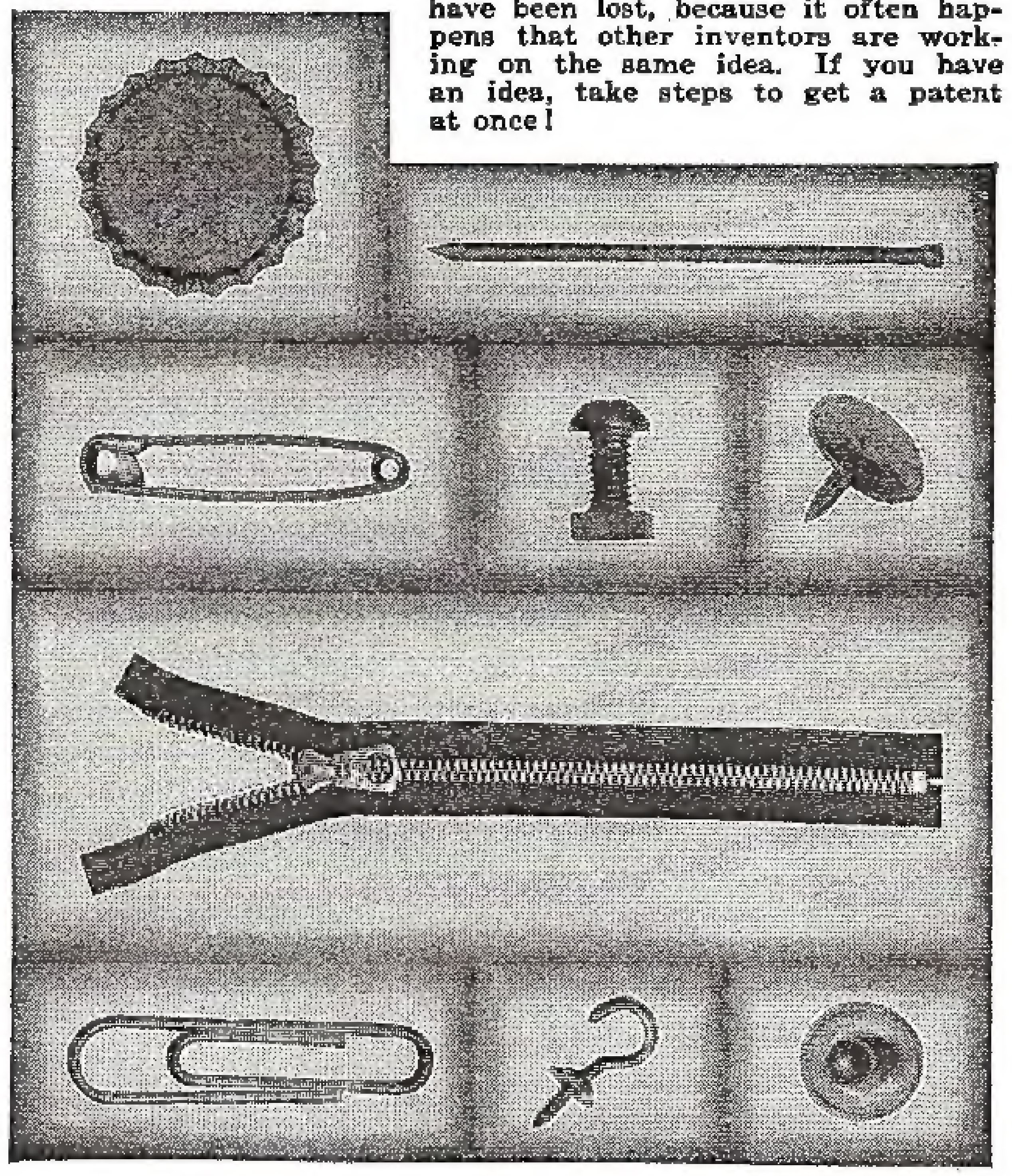
10 As soon as patent application covering the invention is filed in United States Patent Office and official receipt received.

CLARENCE A. O'BRIEN
Registered Patent Attorney
317-R Adams Building
Washington, D. C.

(Copyright Clarence A. O'Brien)

Small Ideas May Have Large Commercial Possibilities

If you hope to realize profits from your invention, you must protect it with a United States Government Patent. Otherwise you may find that all your time and labor have been lost, because it often happens that other inventors are working on the same idea. If you have an idea, take steps to get a patent at once!



THE Free Book shown here was prepared for inventors, to show them exactly what steps they must take to secure a PATENT. If you have an idea, you should send for this book AT ONCE. It will tell you exactly how an application for a Patent is made, what information you must furnish your attorney, and what steps he must take in order to protect your interests. Remember, inventing an article is one thing—securing the exclusive right to manufacture it, use it or sell it is another. Without a U. S. Patent, you cannot expect to reap the profits that your invention may make possible. Send at once for this book. After you get that, you'll know exactly what to do to protect yourself.

KNOW HOW to START KNOW EACH STEP to TAKE

Before Going Too Far With Your Ideas

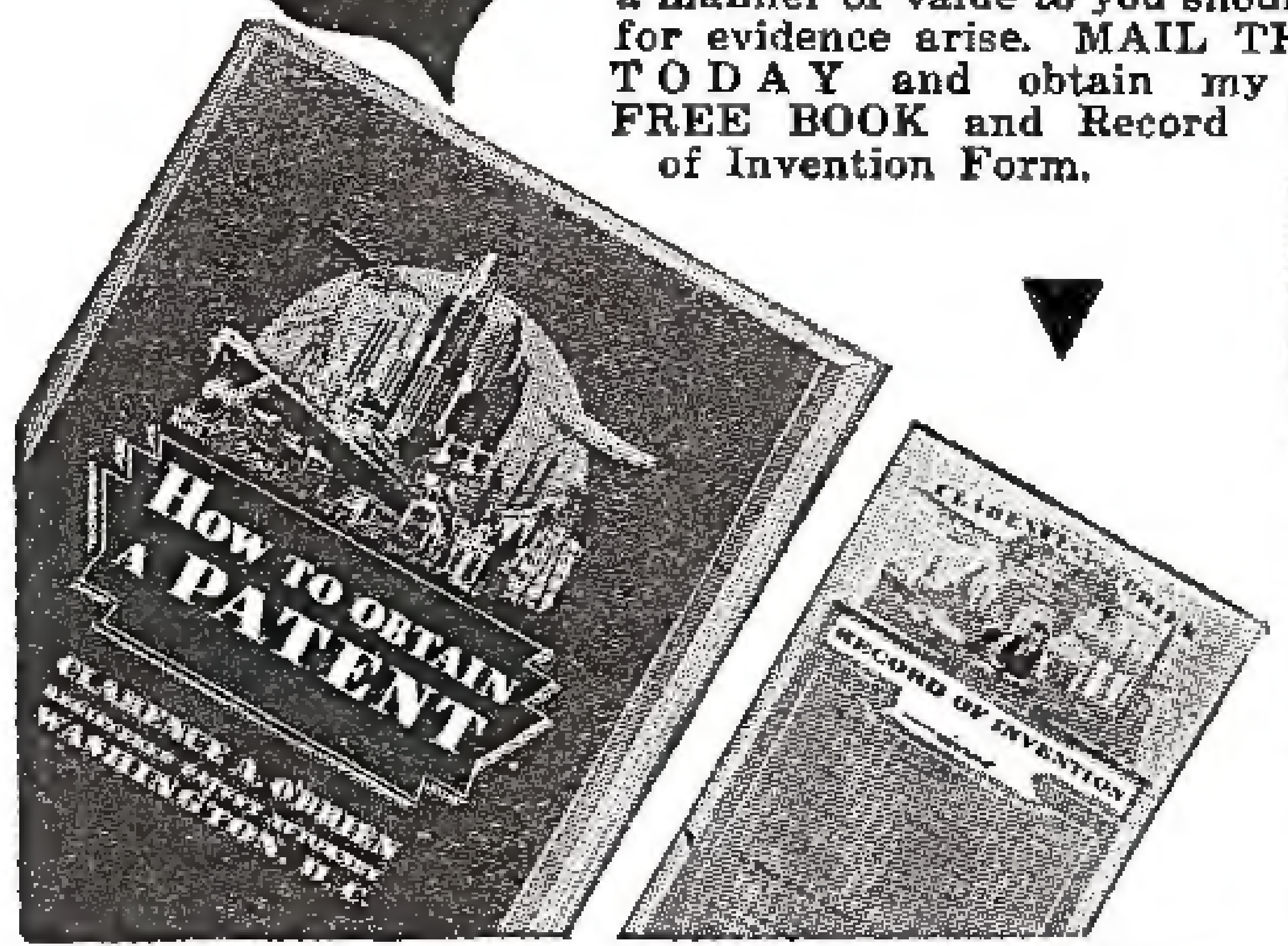
Very often, the patent procedure is what we call a "simple" one—as illustrated here. My FREE BOOK "How to Obtain a Patent" describes what to do and how to go about it. Send for it by all means—let me urge, however, that you take the first step (STEP NO. 1 to right) without further delay. It will prevent wasted work, mis-steps, and going ahead "in the dark"—your whole patent procedure depends upon the first step.

Immediate Search Necessary

A Search at the U. S. Patent Office will disclose one of three things: That you have hit upon an entirely original idea—that you have suggested patentable improvements upon an existing invention—or that your invention has been anticipated throughout, and you should drop it. You should have this information at once. The Search Fee for the First Step (the search) is only $5. The next steps (the whole procedure of obtaining a patent) will be thoroughly explained to you in my FREE BOOK.

My FREE BOOK tells everything you need to know about patents. I will mail this book upon receipt of your letter requesting search—or if you want to read it before having search made, simply fill out the coupon below.

Send For This FREE BOOK



ALSO FREE RECORD OF INVENTION BLANK

This FREE Record of Invention Form enables you to make in convenient form a sketch of your idea and have it witnessed in a manner of value to you should the occasion for evidence arise. MAIL THIS COUPON TODAY and obtain my FREE BOOK and Record of Invention Form.

STEP NO. 1

Make a rough pencil sketch of your invention, describe it fully, and send it to me for preliminary search through U. S. Patent Office —fee $5.00.

STEP NO. 2

My trained searchers will then make a preliminary search of the pertinent U. S. Patents to determine if your invention is probably patentable.

STEP NO. 3

My complete report of search and opinion on patentability will be mailed to you with copies of U. S. Patents that I consider nearest to your invention.

STEP NO. 4

If you decide to make patent application, for customary fees explained in my booklet, my draftsmen will make drawings and proper papers will be prepared for presentation of your invention to the Patent Examiner.

CLARENCE A. O'BRIEN
REGISTERED PATENT ATTORNEY
317-R ADAMS BUILDING
WASHINGTON, D. C.

Please send me your FREE BOOK, "How to Obtain a Patent," and your "Record of Invention" Form, without any cost or obligation on my part.

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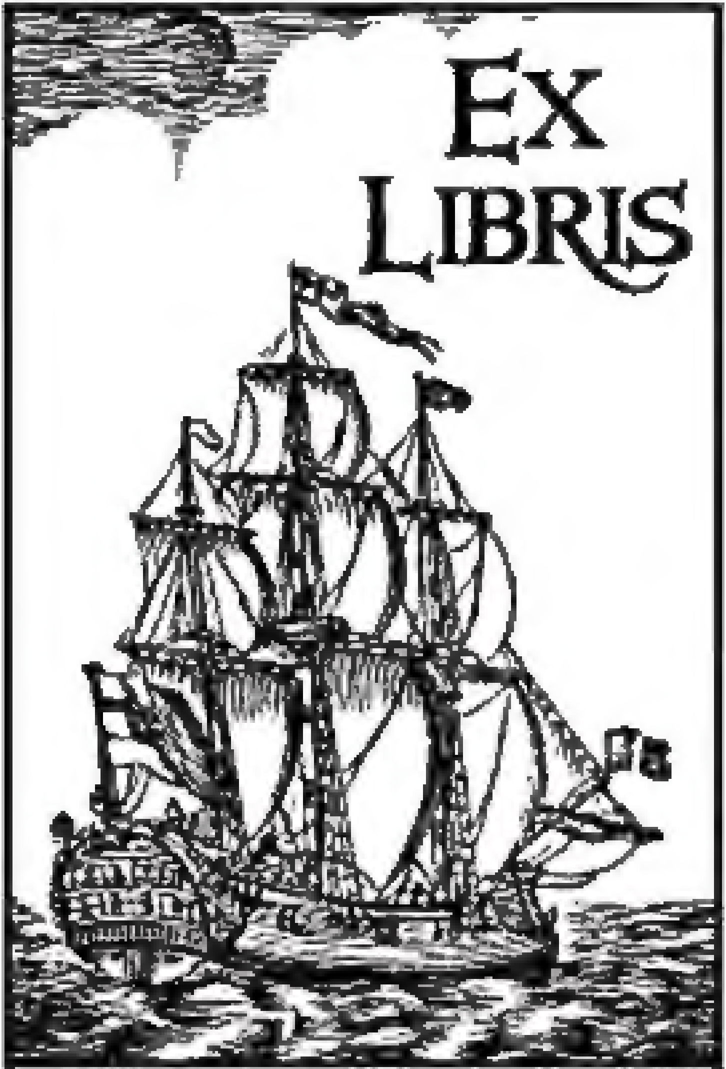

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